THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. AUGUST 2, 1894. CHICAGO, ILL. NUMBER 31

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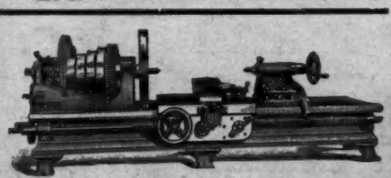

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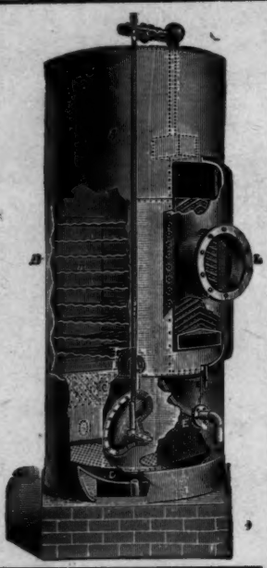

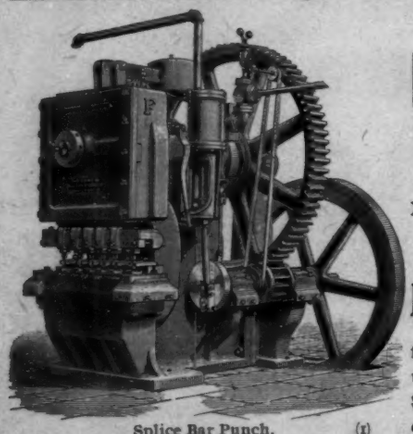

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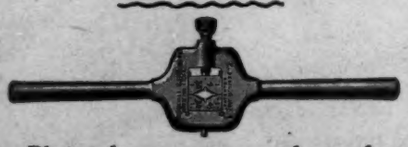

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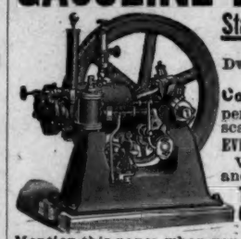

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THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. AUGUST 2, 1894. CHICAGO, ILL. NUMBER 31.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

The coke strike and the tariff bill limit every assertion that can be made about the immediate future of iron and steel and are the controlling factors at the moment. Furnacemen in the valleys have made fresh pilgrimages to Pittsburg in the last few days, but even at close range the dispensers of the bulk of the Connellsville coke supply cannot be persuaded into more definite promises. The negro regime in the coke region is not wearing well. Output increases slowly, but the gains are attended with set-backs and the break of the Huns seems as far off as the day of resumption at valley furnaces. It would almost seem that the principal coke operator had made the strike's full collapse a condition of shipments into the valleys. Further Pittsburg furnaces have started and only four out of the 26 stacks there are now idle. Coke goes East and West more freely than at any time since the strike began, but valley producers of pig iron still hold their hands. Reports from all selling centers agree that the pig iron market in general is maintaining its strength, but it is only strong proof of the restricted requirements of foundries in all sections that prices remain unchanged with so many furnace yards bare of stock. This is true of every producer of iron in the valleys; it is true of certain grades of Southern irons, and in Eastern Pennsylvania, with Western and Southern iron practically out of the market there is only a fair market for local furnaces, with no sign of an advance in price. Some Southern producers of pig are getting back into blast, in view of the advantageous contracts they have been able to make for raw material, and yet it is conceded that no money can be made on the basis of the past few months. The practical stoppage of iron ore imports in the past half year has brought some inquiry for Lake Superior ores from the East, and steel works beyond the Alleghenies that can get coke are likely to anticipate deliveries of Bessemer due them from Pittsburg and the valleys, with the augmented output of their own furnaces. There is unusual activity among steel works, particularly in Pennsylvania plants, and it is probably true that the past week has seen more men employed in the rolling mills and steel works of that State than any other in the year. This means a strong present demand for Bessemer pig, but with the valley furnaces silent and nearly all the Pittsburg and Wheeling district furnaces delivering their output to connected steel works or filling back contracts, spot Bessemer is exceedingly scarce. From $12 to $12.25 is the basis of the latest small-lot transactions at Pittsburg. The billet demand promises to be strong in the immediate future. Inquiries for round lots for Eastern delivery have come up in Pittsburg, but buyers and sellers are some istance apart. The continued scarcity of Bessemer pig has made billet makers firm and there is little disposition to consider offers below $17.25 for deliveries extending through three and four months. Eastern mills, now that Pittsburg is not invading their territory, are well occupied with work, but there is in that section as well as in the West an absence of large contracts that makes the duration of the present activity problematic. Several Western agricultural concerns are figuring on their annual contracts for iron and steel bars. Sheet mills report only fair activity. Building demand is light.

THE CLEVELAND OUTLOOK.

The inquiries from the East for Lake Superior ore have resulted in the purchase of some very low-priced Mesabi Bessemer by a prominent steel company; and in view of the exceedingly light imports of ores in the past six months and the prospect that a 40 cent duty will be imposed on ore, if, indeed the 75-cent duty does not stay, it is reasonable to look for a further Eastern market for the Lake Superior product. The inactivity of valley furnaces, if prolonged through August, means the postponed consumption of close upon half a million tons of Bessemer ores. The immediate result has been a crowding up of lower lake docks, particularly at Cleveland, through the inability of furnaces to take forward their ores. This trouble would have been more serious but for the light shipments from above during the Gogebic strike. Now that Ashland shipments are again of fair volume dock and vessel owners are often put to it to make room for fresh cargoes. While many boats are still out of commission there is no prospect of better rates and the blast furnace situation has lessened the prospect that unsold ore would be brought down.

Pig Iron. Foundrymen, in spite of the meagerness of their requirements, are beginning to hear from furnaces that there is not iron enough in yard to fill orders. The supply of foundry iron has been thoroughly swept up in the valleys and only one furnace is producing foundry grades. While $11 and $10.50 for Nos. 1 and 2, respectively, have been maintained firmly by some furnaces, there has been more or less shading, even under the rapid exhaustion of stocks. The ability of the market to respond to conditions ordinarily bringing an advance seems to have been lost. Charcoal iron is a prolonged drag. We hear of sales of Lake Superior at $13.25, with no discrimination as to deliveries, whether at Detroit or Buffalo. Some of the malleable concerns that bought sparingly last year expect to go through the year without contracting again. The situation at Mahoning and Shenango valley furnaces is unchanged, and there are some free expressions of displeasure at the way the coke situation has shaped itself, or has been shaped. "Within the next few days," is the latest assurance, but in the past week just one stack has started. From appearances, it will be late in the year before some valley furnaces are through with old contracts. Meantime Eastern steel works that bought largely of Bessemer before the strike, are showing some anxiety for the completion of deliveries.

Finished Material. About the same pace is preserved, in demand for mill products of all descriptions. A half dozen Central Western agricultural concerns are arranging for their bar iron and steel, in this market, and are getting low figures. A building for manufacturing purposes brought a 400-ton order for structural material the past week. On the run of small lot business in beams and channels, prices seem a trifle firmer, and 1.30c. @ 1.35. would represent the market on these. In plates there is still a disposition to shade 1.25c at mill.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

A little more business has been going in the past week than in the week before, and consequently dealers in iron and steel products are feeling a little better, and are inclined to look upon the future as not being so entirely devoid of promise, after all. Trouble caused by the failure of the railroads to make deliveries is almost entirely over, as the roads are hauling all the freight that is given them. The South Chicago mills started up on Monday of this week, and it is expected that the Iroquois furnace will be blown in in the near future.

PIG IRON.—Sales of local iron were quite a little larger in the past week than in the week before, and two orders of 1,000 tons and one of 1,300 tons were taken, besides quite a large number of smaller orders ranging in size from carloads to 100 and 200 tons. The future appears a little brighter as well, and dealers are expressing a fair degree of confidence in the market. Prices of local iron have been reduced a trifle, but this is only because of competition between local furnaces. Southern iron dealers report a little more inquiry, but state that the few sales made have been small, and they do not look for any large business as long as present conditions prevail. Prices are reported a little stiffer by one of the Southern furnaces, but we make no change in our quotations. Exception has been taken to a remark made in this column last week, on the "tendency of Southern furnaces toward direct representation." It is true that one of the largest Southern companies is at present making arrangements for starting its own office here, and according to good authority one or two of the other large companies are contemplating the same move. This is as much due to the fact, it is stated, that local dealers feel that they can make as much or more by freeing themselves from connection with Southern furnaces, and buying and selling on their own responsibility, as because the Southern furnace men feel that they can better handle their business by having their own man on the ground. Our pig iron quotations are as follows:

Lake Sup. Charcoal	$14 50@15 00	South'n Silveries No. 1.	$ 11 50
Local Coke Fdy. No. 1	10 25@10 50	South'n Silveries No. 2.	11 00
Local Coke Fdy. No. 2	10 00@10 25	Jackson Co. Silveries	15 50@16 00
Local Coke Fdy. No. 3	9 50@10 00	Ohio Silveries No. 1	14 00@14 50
Local Scotch Fdy. No. 1.	10 75@11 00	Ohio Silveries No. 2	13 00@13 50
Local Scotch Fdy. No. 2.	10 00@10 50	Ohio Strong Softeners	13 00@14 00
Local Scotch Fdy. No. 3	9 50@10 00	Alabama Car Wheel	17 75@18 25
South'n Coke No. 1	10 75@11 00	South'n Charcoal No. 1.	14 50@15 00
South'n Coke No. 2	10 75@11 00	South'n Charcoal No. 2	14 00@14 50
South'n Coke No. 3	10 50@10 75	Malleable Bessemer	10 50@11 25
Southern No. 1 Soft	10 75@11 00	Coke Bessemer	11 25@11 50
Southern No. 2 Soft	10 50@10 75		

BARS.—Quite a good run of inquiries has been received in the past week, and some few fairly large orders taken. Some of the inquiries are for lots as large as 500 tons, ranging from that down to carloads. Prices are being well maintained, and are a trifle higher, if anything, than they were last week. Quotations are now made at 1.07½c to 1.15c for iron, and 1.25c to 1.30c for steel, f. o. b. Chicago.

STRUCTURAL MATERIAL.—Business has been very light, both in orders from stock and from mill. Quotations are as last reported: Beams and channels, 1.50c to 1.60c; plates, 1.50c to 1.55c; angles, 1.50c to 1.55c; tees, 1.65c to 1.70c. Small lots from stock are quoted ½c higher.

RAILS AND TRACK SUPPLIES.—The South Chicago mills started up the first of this week, but very little business was done. Prices are unchanged. Rails, $25 to $27; splice bars, 1.30c; track bolts, 2.10c. to 2.20c; spikes, 1.80c to 1.90c.

BILLETS AND RODS.—Orders have been received for a few small lots, but no business of any consequence has been done in billets. In rods the market is quiet with no sales. Billets, $18.250 $18.50; rods, $25.50.

PLATES.—Very little business is being received, either in mill orders or for delivery from store. Prices are unchanged. Tank steel, 1.45c to 1.50c; flange steel, 1.65c to 1.75c; firebox steel, 3.75c to 4c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—There has been a fair amount of buying in the last week, but no large orders have been taken. Prices are as last reported. Open hearth spring, machinery and tire steel, 1.85c to 1.90c; crucible spring, 3.50c; machinery, 4.50c to 4.75c; tool steel, 6½c and upwards.

SHEETS.—Trade is reported a little better in the past week, although no very large sales have been made. The outlook is very much better, and a good business is looked for in the near future. This applies to both black and galvanized sheets. Prices are made at 2.40c to 2.45c for black sheets, and galvanized at 75 and 15 per cent. discount on mill shipments, and 75 and 5 on store orders.

OLD RAILS AND WHEELS.—Business has been at a standstill, and no sales have been made. Prices are made: Old wheels, $10; old iron rails, $10.50 to $11; old steel rails, $9.50 to $10.

SCRAP.—Very little, if any business is being transacted. Prices are unchanged but are only nominal. No. 1 mill, $6 to $6.50 No. 1 forge, $9; No. 1 machinery, $7; axles, $13; cast borings, $3 50; wrought turnings, $4; axle turnings, $5.50; mixed steel, $5; coil steel, $7; leaf steel, $8; heavy cast, $7; stove plate, $5.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. More pig iron is being produced in this district than at any time in the past four months, but the consumption in the steel works of some producers, added to the deliveries that must be made on old contracts leave little for prompt delivery. As yet no iron has been made in the valleys for the market, the few furnaces blowing having old contracts. Some negotiations are on foot for good-sized blocks of Bessemer for Eastern shipment, in the next four months. Furnaces are not pressing sales under existing conditions, but it is expected that another 10 days will furnish a better basis for calculations since the coke output is steadily increasing. For August and September delivery, $11.75 has been paid in a few recent transactions. Some coke contracts expired with July 1 and Aug. 1, and where immediate shipment is secured furnaces are paying $1.50 for coke at ovens, but in the case of contracts running through the year, deliveries subject to strike delays, the basis is not far from $1.10. A sale of 1,000 tons of Bessemer, August delivery, is reported at $12. Gray forge iron continues firm and $10 is the market for August delivery. In billets there is good inquiry from points farther east. One 10-000-ton contract for Johnstown has just been completed by a local mill, and prices have been asked in the past week, by outside buyers, on a 20,000-ton and a 10,000 ton lot. In the continued scarcity of Bessemer, billet makers are inclined to hold their figures up, on deliveries in the next two months. The coke strike rules this market, also. For deliveries in the next month, $18 is still the price; on three months deliveries sellers hold to $17.25 and $17.50, but buyers expect to shade these figures. The activity of iron and steel mills throughout the State makes an urgent call for raw material. The immediate output of finished product is probably greater than at any time this year. Opinions differ as to the extent to which this activity will be supported by fall demand. In structural material, very little large work is in sight, but the aggre-

gate of small orders is fair. Prices are still quoted at 1.25c on beams and channels; 1.20c@1.20c. on tank plate; 1.10c@1.15c. on grooved and 1.20c @1.25c. on sheared steel skelp, and 1.20c@1.30c. on grooved iron and 1.30c. @1.40c. on sheared. For wrought pipe there is a well sustained demand, with increasing supply.

Louisville. There is no change in prices for Southern iron and soft grades still continue scarce. Consumers are yet buying from hand to mouth, and do not show a disposition to purchase their season's supply save on basis of $6.75 for No. 3 foundry, and $7 for No. 2 soft, Birmingham, prices 25 cents under the figures held by the iron companies. Shipments are prompt and consumers are now experiencing no trouble from delayed shipments. As buyers of iron have for the last month been very much annoyed and their business curtailed by outside troubles, it is possible that from now on there may be increased demand for iron from the resumption of their works, and that the situation will justify them in meeting the furnaces' views, and buying freely for delivery extending to the end of the year. The furnaces in the Sheffield district have not yet gone in blast, and at Embreeville and Middlesborough the disposition is to do nothing at the present moment. It is felt, however, a wise time to make contracts for raw materials, and furnaces that contemplate going into blast in the next few months are desirous of making arrangements complete at the present moment for as long a period as possible for raw material used. This is tempting certain furnaces to go in now in spite of iron being so low, as they feel they can make arrangements for producing iron cheaply and more advantageously at this time than they can later on, and feel that by the close of the year the tendency of the market will be upward and will justify their going in blast.

Cincinnati. The interruption of the pig iron traffic by the coal miners' strike and the railroad strike immediately following were not seriously felt by consumers of pig iron during the prevalence of the strike, as there were supplies in yard and en route; but recently, as stocks in hand have been exhausted and the usual steady supply has not been at hand to fill the gap, the real trouble is keenly felt. The past fortnight has been the most vexatious ever known in filling orders. In endeavoring to hurry shipments and explain to anxious customers the cause of delay, sellers have been kept busy. The railroads were far more crippled than they conceded at the time, or their management has been bad. The Southern furnaces with steadily increasing supplies of coke will catch up and will soon be freer for new orders. The protracted difficulties in the Connellsville coke district have been the opportunity for the Virginia, West Virginia and Kentucky coke companies who have enjoyed a liberal patronage. General trade shows signs of animation. Inquiries are quite numerous and orders more liberal. Indications favor a marked improvement. With the knowledge on the part of buyers that prices of pig iron are approximately at cost, any promise of business will prompt purchasing and as such sentiment and action are contagious, we would not be surprised to see an active business ushered in.

St. Louis. Inquiries have been more numerous and iron for shipments through the Fall months is in demand. Prices are firm and stocks of iron at the furnaces would fall short of filling orders booked for July delivery.

Philadelphia The demand this week for ordinary pig metal has been unusually light. Several trades are now pending for round lots of Bessemer iron. Prices of coal have have dropped down to about the figures ruling before the strike. Coke is almost plentiful and is being offered at fairly low prices.

BESSEMER STEEL, FIRST HALF OF '94.

The following table gives the production of Bessemer steel ingots in the first half of 1894, compared with the first and second half of 1893. In the figures for the periods mentioned are included the production of Bessemer steel by the Clapp-Griffiths works and Robert-Bessemer works:

States—Ingots.	First half 1893. Gross tons.	Second half 1893. Gross tons.	Total. 1893. Gross tons.	First half 1894. Gross tons.
Pennsylvania	1,337,079	789,141	2,126,220	1,129,559
Illinois	220,059	94,770	314,829	252,080
Ohio	232,980	115,161	348,141	171,045
Other States	301,939	124,557	426,496	114,767
Total	2,092,057	1,123,629	3,215,686	1,667,454

The following table gives the production of Bessemer steel rails of all weights and sections, including street rails, in the first half of 1894, compared with the first half and second half of 1893. In this statement we do not include street and other Bessemer rails which were rolled from purchased blooms in any of the half years mentioned.

States—Rails.	First half 1893. Gross tons.	Second half 1893. Gross tons.	Total 1893. Gross tons.	First half 1894. Gross tons.
Pennsylvania	429,059	210,372	639 431	284,061
Illinois	170,263	61,997	232,260	95 955
Other States	104,918	59,774	164 662	19,388
Total	704,240	332,113	1,036,353	399,404

The great decline in the production of both Bessemer steel ingots and rails in the twelve months beginning with July 1, 1893, is shown by a comparison of this production with that of the first six months of 1893. In these six months we produced 2,092,057 gross tons of ingots and 704,240 gross tons of rails; in the last twelve months we produced 2,791,083 tons of ingots and 731,517 tons of rails, In no year since 1879 have we made so few steel rails as in the last twelve months.—[Bulletin.

Coke Supply Slowly Increasing.

Reports from the Connellsville region continue to tell of increased output, and yet complications exist that make the situation far from being all that the operators want. Though only 1,000 strikers attended the meeting at Scottdale, July 30, the determination to go on with the strike seemed just as firm as ever. The negroes have been receiving $1.50 a day and their board. It is said that with Aug. 1 the free board ceases, at some of the plants, and trouble is looked for. The negroes have given a good deal of trouble in some quarters from their trifling and childish disposition; yet, on the other hand, the testimony is given that they are becoming apt in the work and are proving measurably satisfactory. The strikers claim that the cost of coke is about 50 per cent. more than before and that the operators will not want to go on long on this basis. On Monday it is reported that 956 cars were shipped from the region. In the week ending July 21, the total shipments were 4,350 cars, of which 1,830 cars went to Pittsburg and river tipples, 1,520 cars to points West and 1,020 cars to the East. The output for the week is put by the *Courier* at 101,522 tons, against 87,462 tons the week previous. Active ovens, 9,779, a gain of 1,200. Circular prices of coke are still $1 for furnace, $1.15 for foundry and $1.40 for crushed. For immediate delivery furnace coke ranges from $1.25 to $1.50 and foundry coke from $1.50 to $2.50.

WE have received from the Peninsular Stove Co., of Detroit, Mich., their new catalogue of water heaters and warm air furnaces. The catalogue contains descriptions of the various heaters and furnaces made by the company, together with illustrations and testimonials. It will be sent on application to the company.

THE Otis Steel Works, Cleveland, have started the plate mill and forge and about 500 men are at work.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

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FURNACE FIRMS AND THE MESABI.

The establishment of connections between Mesabi mines and blast furnace companies is one of the significant developments in iron mining. The Kimberly and Oliver properties were the conspicuous examples of this tendency, in the early days of this new range. Later a number of Mahoning Valley pig iron producers, organized as the Mahoning Ore Co., got important holdings at the west end of the range. Then came the deal by which the Carnegie Steel Co. became part owner of the Mesabi Mountain. Still later, through the organization of the Biwabik Bessemer Co., the relation between the Biwabik and a Mahoning valley furnace company became more intimate. Within the last fortnight, another move in the same direction is the taking of options on a Mesabi property by Shoenberger, Speer & Co., of Pittsburg, which means that a further percentage of Allegheny county soft steel may be made from the ores of the new range. While there are properties on the older ranges which have a more or less direct connection with certain steel companies, the number of such cases on the Mesabi is probably equal to the total of the others.

Not only does this tendency suggest a more restricted field for independent producers of ore, and continued close competition that will make profits possible only to the largest and best equipped properties, but it indicates that increasing prominence will be given to Mesabi ores in the furnace practice of the future. The vastness of the deposits on that range will lead to the finding of ways to overcome any objections furnacemen may have raised to their employment in large quantities. Furnace firms having Mesabi interests will not be likely to draw the line at 25 per cent., as the principal Pittsburg producer has done thus far. Furnace practice will adapt itself more and more to these ores and the briquette method employed by Edison in the preparation of concentrates for the furnace may open the way to a freer use of fine Mesabi Bessemers than has yet been thought advisable.

There is another point to be considered in this connection, namely, that another year will find fewer old-range ores available to the furnaceman on the basis that has prevailed the present season. While the Gogebic range, rather than the Mesabi, set the pace for 1894, it is not disputed that the widely advertised cheap costs of Mesabi mining brought the market to the depth that has been reached, and in the case of the Consolidated product, at least, has carried figures below anything thought of at the opening of the season. The cost of mining next year's Mesabi product, moreover, is not likely to be greater than that of this year, while in the case of a number of old range mines that have put out cheap ore this year, no considerable additional production will be possible without a greater or less outlay for dead work. The expense of sinking shafts to new levels, of drifting and timbering, and all the work that is apart from the actual mining of the ore, has had no place in this year's reckoning. In some cases, it is safe to say, mines have been robbed to get the ore on the market at the prices that have ruled. This only postpones an expense that must be borne sooner or later and it will have to appear in the cost of the ore, and the furnaceman in turn will have to pay it, as he has not done this year.

The result will be the establishment of another basis for long-tried ores, than the price per unit of the Mesabi product. And while furnacemen may be expected to use all the new range ore they can, within the bounds of satisfactory furnace operation, that very fact will emphasize the value of such other ores of approved record as are demonstrated to be indispensable in a satisfactory mixture.

THE FUTURE OF CHARCOAL IRON.

Plans that have been under consideration for some time by the Iron Cliffs Co., owners of the Pioneer charcoal furnaces at Negaunee, Mich., have now been perfected for the erection of a charcoal furnace of large capacity at Gladstone, Mich. With considerable stocks of non-Bessemer ores on hand at their mines, which cannot be sold at a profit under present conditions, the company turns to the smelting of the ores in an upper lake furnace of large output, as a proposition offering a possible profit. Gladstone has been selected as the site, owing to advantages offered there, and for the present one stack will be erected. This will be the largest charcoal stack with one possible exception, in the United States It is to be built with a view to changing to coke, should that be thought advisable, and it is understood that in the latter event, the erection of Otto-Hoffman ovens and the conservation of by-products, as is done in Europe, is part of the plan. Either proposition is an enterprising one in these days, and the development of the project will be watched with interest.

It is plain that the only hope for profitable production of charcoal iron in the future is in the operation to its utmost possibilities, of a furnace of exceptional capacity, and in connection with the cutting of timber, the erection of a saw mill to convert into lumber such of the hard wood as is too valuable to send to the charcoal kilns. This means, moreover, that just as the smaller mines in the Lake Superior region are out of the race for an indefinite period, many of the charcoal furnaces of small output that are now silent will not soon operate again, at a profit. The few large stacks, of modern equipment, will get the business. The figures below, showing production of charcoal iron and total pig iron in the United States, in gross tons, in the past three and one half years, are suggestive in this connection:

	1891.	1892.	1893.	First half 1894.
Charcoal iron	576,964	537,621	386,789	102,697
Total pig iron	8,279,870	9,157,000	7,124,502	2,717,983
Per cent. Charcoal	6.9	5 8	5.4	3.7

This shows that the percentage of charcoal iron produced in the United States—which in a period of years

may be taken as practically equivalent to the consumption —has fallen from 6.9 to 3.7 or nearly one half. We have called attention to this tendency on previous occasions, not with any view of disparaging this interest, but merely to point out the direction in which the trade winds are blowing.

The leader of the recent miners' strike at Ironwood, Mich., is likely to remain in jail some time, owing to the number of his libelous utterances directed against reputable citizens. Several hundred men in Ironwood, who are not likely to get work in the mines in months, if ever, will have a chance for bitter reflection, unsweetened by the fair promises of the walking delegate. After getting 50 cents apiece from 700 men for "organizing" them, the only equivalent being his promise of $4 a week for every union man as long as the strike lasted, Notten brought all his men out and stopped work at every Ironwood mine. In the several weeks that have elapsed, the idle men have lived on Notten's promises of help, but not a dollar have they seen of the $4 strike benefit. Violence has ruled and some lives have been lost. The mining companies who were found by the State Labor Commissioner to be putting ore on the market at a price absolutely precluding the payment of better wages, need not be expected to contribute a dollar for the relief of these men who sought to destroy their property. Yet that relief will be needed, to keep them from starving, is just as sure as that Winter is ahead. The operation of the mines at Ironwood will not need to be as extensive for the next six months, as before the strike, since sales have been quite well covered by the output already achieved. Idleness with no prospect of work and the failure of every promise on which they were induced to go out, are the net result of the Gogebic strike to nearly every man of Notten's dupes. Dear experience this, and yet the production of strikes is the most flourishing industry in the land and the strike leader, judging from his achievements, the most persuasive orator out of Congress.

THERE were in stock at shipping ports in England July 1, of this year, 519,368 boxes of tin plates, against 368,901 on July 1, 1893. The average of stocks on the first of the month, in the first half of the year has been 497,837 boxes, as compared with an average of 367,867 boxes in the first half of last year. The effect of the pendency of a bill at Washington cutting off one cent a pound in the duty on tin plates is plainly seen in the backing up of the current of imports that had been steadily running in this direction. In the first six months of 1893 the total imports of tin plates from Great Britain into the United States were 160,420 tons; in the first half of this year the total was 100,364 tons, a falling off of nearly 40 per cent. In the same two periods British exports of tin plates to other countries were 57,147 tons and 61,831 tons respectively, showing a slight increase this year over 1893. Canada took 6,046 tons in the first half of 1893 and 7,065 tons the first half of this year.

IT would not be surprising if the present untoward combination of circumstances, that has for the time being "pocketed" the furnacemen of the Mahoning and Shenango valleys, should lead to a renewal of the efforts they have made in the last half dozen years, to secure an independent coke supply. The project under consideration the last time this matter was up, two or three years ago, was the acquisition of coking coal lands by Mahoning Valley furnace firms and the erection of ovens at their furnaces. The railroads have been so well content with their coke business, however, that they have made most discouraging responses to the attempts to figure on coal freights. The building of a new railroad is not a proposal that men will jump at with avidity in these times, but that is probably what Mahoning valley furnacemen would have to consider in connection with any project for the shipping in of coal to be coked in furnace yards. The advantage of the arrangement that has existed so long, and that has brought the valleys into the position of dependence upon the chief coke producer, is the reciprocal patronage they have enjoyed from the Carnegie Steel Co. in its purchases of pig iron. In a situation like the present, with valley production nil, this is a sort of reciprocation that does not reciprocate.

REPORTS agree that as dull as the foundry trade has been all over the country, the East has suffered more than the West and the South. Shipments of foundry iron tell this story, and the statistics recently gathered in Maine showing that 60 per cent. of the capacity of foundries reporting July 1 was inactive, is a significent straw. We believe that the records of machine tool sales, were they accessible, will show that the West, particularly the Central West, has held up nearer to its ordinary volume of machinery purchases in the past year than have the Eastern States.

EVEN the activity of street railway companies and the building of inter-town lines did not suffice to compensate, even in a measure, for the beggarly rail purchases of the steam railroads in the year ending June 30. The total of Bessemer steel rails rolled in the United States in that twelve-month was 731,517 tons, against 704,240 tons in the first six months of 1893, with its prosperity pace.

Chas. D. Walcott, long connected with the U. S. Geological Survey as paleontologist and geologist, has been promoted to the head of the Survey, Maj. J. W. Powell having given up the directorship owing to ill-health and an accumulation of duties. The *Engineering and Mining Journal*, in its current issue says: The new director is a clear-headed business man with great executive ability, and we are told he intends to concentrate the expenditures and work of the Survey on the preparation and prompt publication of the geological maps of many parts of the country where surveys have been made either by the United States or the State Geological Survey; while in the new work, we understand, he proposes devoting greater attention to the study of economic geology and the correlation of the geological data accumulated in the several State surveys, and that he will insist on the prompt publication of the results of the work. It is indeed infinitely more important and more useful both to the Survey and to the public, that the strictly geological work should be thoroughly well done and made available promptly, than that the publications of the Survey should give a smattering of information in every field of human knowledge."

A TIN plate company has agreed to locate in New Lisbon, O., if citizens there will secure them a tract of land at a reasonable price and then buy from them 300 lots at $200 each. Four buildings are proposed and 200 men are to be employed. Chas. M. Bray, secretary and mechanical engineer of the Lloyd Booth Co., of Youngstown, has represented the projectors in the preliminary negotiations. Others interested are W. T. Graham, B. M. Caldwell and J. J. Holloway, of Bridgeport, O.

PLUMBERS will, no doubt, before long have considerable to do on account of the corrosion from electricity of pipes of all kinds when laid underground. This will be unfortunate for those who live along the line of electric railroads, but, in many cases, the plumbers will find it a source of gain.—[Sanitary Plumber.

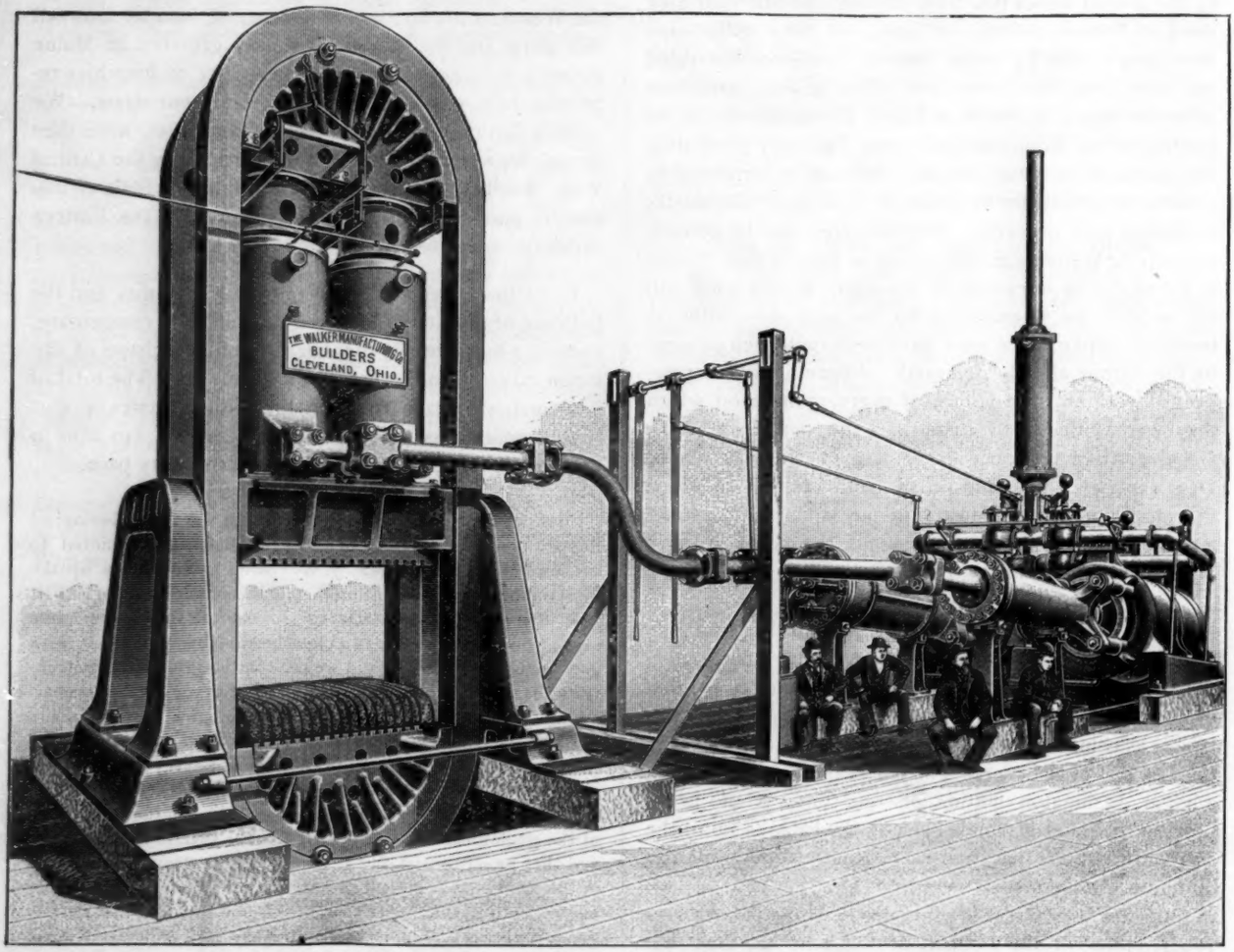
SOME HEAVY FOUNDRY WORK.

The accompanying engraving illustrating Taylor's 2,000-ton steam and hydraulic cotton compress, built by the Walker Manufacturing Co., of Cleveland, for Mr. Will W. Bierce, engineer and contractor, of Montgomery, Ala., the designer and owner of patents, who has installed many of these large presses in the Southern States. One, built by the Walker Manufacturing Co. for him, completed about a year ago, is in operation at Houston, Tex. Another, shipped within the past month, is now being erected at Galveston, Tex. A third is under construction at the Walker Manufacturing Co.'s works. The purpose of this apparatus is the compression, under a pressure of about 2,000 tons, of regulation size cotton bales into flat bales, occupying about one-third of the usual space, the object being to economize space to the greatest degree in shipping.

The press rests upon a foundation 18 feet by 10 feet, and stands when closed 26 feet high above the floor line; and when open extends 5 feet below the floor. The upper platen and a pressure of 2,000 tons would thus be equivalent to 1,400 pounds per square inch of platen surface.

The engine occupies a floor space 17x27 ft., and stands 8 ft. high above the floor level, exclusive of steam and exhaust piping. It consists of two steam cylinders placed side by side, each connected tandem to a water, or power cylinder. The steam cylinders are the same size, their diameters being 64 inches. The power cylinders are of cast iron, with very thick walls to resist the enormous pressures to which they are subjected. The plungers have a stroke of 9½ ft. The piston rods are 8 inches in diameter, and the couplings between the power and steam cylinders are made very strong since both have to resist a thrust of about 400,000 lbs. The hydraulic piping between engine and press, which has to withstand a pressure of 4,000 lbs. per square inch, is made of cast steel.

In starting, both pistons being at the back ends of their cylinders, steam from the boilers, which carry 125 lbs. pressure, is admitted to the low pressure side. The low pressure piston moves forward forcing the liquid into the hydraulic cylinders, and thus raising the lower platen with the bale.



is supported at its ends by heavy housings. Its lower surface, as well as the upper surface of the lower platen, is provided with grooves of a dovetail section to allow the insertion of the hoop-iron straps which hold the bale in shape, after it is compressed. On top of this upper platen casting, rest two heavy hydraulic cylinders of cast steel. These cylinders carry plungers 26½ inches in diameter. The packing rings are of an improved form, which have been found very effective and durable. A heavy cast iron entablature rests upon the top of the plungers and supports the two forged iron links, in the lower loops of which rests the lower platen.

The links are machine finished all over, and fit accurately the turned surfaces of the upper and lower castings. Their united tensile strength is 10,000 tons. The operation of the press, as will be understood from the engraving, is effected by forcing up the plungers by the hydraulic pressure, thus raising the lower platen. When open, the distance between platens is 5 feet. The platens are 7 feet by 2 feet 10 inches, The movement ceases when the pressure on the bale reaches about 400 tons and balances the steam pressure. This requires about ¼ of the stroke of the power piston. Steam is then admitted to the high pressure side, and the high pressure power piston advances until the pressure on the bale is 2,000 tons, which again balances the steam pressure.

When the press is in this condition, the pressure in the hydraulic cylinders and piping is about 3,800 lbs. per square inch, and the thrust on the power piston rods is 400,000 lbs. When the high pressure piston begins to act, a check valve situated at the end of the low pressure cylinder prevents the increased pressure from reaching the latter. As soon as the binding straps have been applied to the bale, communication is established between front and back ends of the steam cylinders, thus equalizing the pressures on the opposite faces of the the pistons, and immediately afterwards, when the pressure on the bale is relieved, the check valve is lifted. The weight of the parts—the links, the entablature and lower platen, and the

hydraulic plungers—is sufficient to open the press, forcing the the power pistons back to their starting positions at the back ends of their cylinders, and leaving everything in readiness for the next bale.

After the first cycle, however, the process is slightly different, for instead of using live steam on the low pressure side, the exhaust from the last operation of the high pressure side is used, all the other steps of the process being as above described. The exhaust from the low pressure side passes through a feed water heater into the atmosphere. It will thus be seen that advantage is taken of the expansive action of the steam and the economy of operation thereby augmented. In its regular working, therefore, the machine is in effect a compound engine.

All of the movements of this immense press, aggregating 300,000 pounds, are controlled with ease by only two levers, a surprising fact considering the mammoth proportion of machinery. The press has an average capacity of 1,200 bales in ten hours. But few shops have facilities for handling such heavy work. The Walker Manufacturing Co.'s plant was selected after a careful investigation of the facilities of the largest establishments in the country.

Canadian Testimony to Our Tin Plate Progress.

A gentleman interested in iron manufacture at Montreal, who had just visited several tin plate works in the United States, made these observations recently to a correspondent of *Hardware*, of Toronto: "It is beyond cavil that the business of manufacturing tin plate across the lines is in such a position as to fear no competition or revenue complication. The present condition, despite the general depression in business, is fairly encouraging, and it is only another line of the iron trade in which American industry at some day in the near future bids fair to become a keen competitor in the markets of the world. I learned generally in the course of my tour that imported tin plate was used only in cases where the domestic plate was unobtainable. In fact the latter is rapidly becoming the choice of American users.

"During six months in the latter part of 1893, the official returns at Washington give an output of 54,496,721 pounds of tin and terne plates. Of the output more than 58 per cent. was made from sheets rolled in the United States, and fully 96 per cent. consisted of the class of plates weighing less than 63 pounds to the 100 square feet. The aggregate quantity of American sheet iron and steel made into articles and wares terned or tin plated during the half year was 56,792,241 pounds. Now these figures will make it plain to any one who understands the conditions of the tin plate trade that this industry is in a position across the lines where it can hold its own against any rival in the home market, and that if it developes as other branches of the American iron industry have done it will soon have a surplus to sell in the outside markets of the world. It is noteworthy, also, that the bright tin plate product of American manufacture appears to be making its way into the home markets upon its own merits. It has outdistanced expectations in fact in quality, while the popular impression that it would never equal the imported plate has been dissipated. Improved machinery is being constantly devised in this as it has been before in other iron lines, and this is giving the American tin plate manufacturer an advantage over his Welsh competitor, who, for various reasons, is tied to old-fashioned methods."

THE Toledo Machine & Tool Co., Toledo, O., write us that the fire which occurred in their factory two weeks ago, destroying a large portion of their patterns, and damaging the factory by water, has caused but temporary delay, and they are now again in running order with the regular number of hands, and an additional force to help out on present orders. They are now prepared to receive orders and give them careful and prompt attention. The regular line of presses and other machines they have been building heretofore will be turned out as usual. Patterns that were destroyed are being replaced, and such improvements are being added as will be to their advantage.

NEARLY all the foundry coke sold in Chicago is Pocahontas and West Virginia.

RECENT FEATURES OF THE NAIL TRADE.

A very significant feature to the nail market in the past few weeks has been the unusual difference in price that has ruled between the cut and wire nails. The coal and coke strikes have affected both very much. During the worst period of the strikes many mills were unable to get fuel to make their steel. Nail mills that formerly made their own billets and slabs have been obliged to purchase them elsewhere and as both have advanced in price manufacturers of nails had to put up their prices as a result. Circumstances afforded a most excellent opportunity for putting up prices and no class of manufacturers seem to have taken better advantage of them than the makers of wire nails.

As soon as they saw fuel getting scarcer and higher and raw material advancing, they met and decided to lift values, and they have been able to maintain the advance well. Previous to the strike wire nails in kegs had been selling for 90 cents per keg with fair extras, and were advanced as high as $1.15 per keg two weeks ago, or up to the time the coal strike took a turn. Since prices have fallen off to $1.05 per keg, but have recovered to $1.10 as manufacturers are more confident of a maintenance of price in the very near future. Hot weather is always a poor time for the production of nails, as the men in the mills dislike to work and do really little work during the hot months. Moreover, the employers have to act diplomatically with them, otherwise they may quit work.

The consumption of all kinds of nails must surely have fallen off 25 per cent., if not more. The prospects for business in the summer are not at all bright, but so long as the production is kept down to that point where it will not exceed the consumption, prices will probably be maintained. Anybody's views on such a matter would be mere speculation, for if, as is now thought, the productions of other kinds of iron and steel will be more than the demand calls for ere long, it seems reasonable to expect that the production of wire and other kinds of nails, for that matter, will also be in excess of buyer's requirements in a short time.

While the wire nail manufacturers have taken advantage of scarcity of fuel and raw material, the cut nail makers seem to have been able to get but a very slight improvement in prices. Just previous to the strike sales were made at about 87½ cents per keg with fair extras. The best price manufacturers in the West are getting today is 90 cents per keg. New England manufacturers have been selling cut steel nails for about $1.05 per keg and cut iron nails for $1.00 per keg. A year ago these nails were bringing from 10 to 15 cents more per keg than ta present. Our New England makers of cut nails just about hold their own. They have an established trade which takes their nails though they cost more than the Western nail. Usually there is a difference of about 15 cents per keg between the f. o. b. price of the Western and New England nail and very often the lower freight rates which are paid on New England nails counteract this difference.

There are many cases, however, where it costs about as much to ship from one point in New England to another as it does from Western Pennsylvania to New England points. The nail people are not the only ones who are much opposed to this inequality in freight. If continued much longer it will drive away what little iron manufacturing business there is left.

In studying the iron situation one is most forcibly impressed with the revolutions that are taking place in the kinds of nails used. Not many years ago the cut iron nail was almost universally used, but it has been fast superseded in late years by cut steel and wire nails. Steel seems to be displacing iron in nail manufacturing as in other lines. Today there are but a few manufacturers in the country that are making iron nails. But one remains in New England, and that company which a year ago was making iron nails only, is now making steel nails as well.—[Boston Commercial Bulletin.

THE Buhl Stamping Co., of Detroit, in an attractive catalogue just put out, call attention to their tubular lanterns and lamp goods. The new things in their line to which special attention is directed are their No. 15 side lift lantern and their No. 200 top lift lantern. A feature of the catalogue is the index and telegraph code with a tabulation of weight and bulk of cases.

LAKE SUPERIOR IRON MINES.

Ashland ore shipments in the last week of July were 36,754 tons; total for the season, 733,603 tons.

At a meeting of the miners' union at Ironwood, Mich., July 28, the strike was declared off. The five companies of troops on duty at the mines since July 4 have been ordered home and deputies are now in charge. The strike has cost the county over $30,000, and wage losses are put at $100,000. The Norrie is operating three steam shovels and sending 5,000 to 7,000 tons of ore to the docks daily.

The shipments of ore from the Chapin mine are now divided between the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul.

The Lake Superior Iron Co.'s reported gross earnings in the year ending April 30 were $1,210,574, with net profits of $120,470.

The Standard Ore Co. has secured a reduction from 55 to 35 cents on the royalty on Cincinnati ore and the mine may be worked. It is stated that a reduction has been made by the Standard Ore Co. in the contract terms to the Thomas Iron Co., of Catasauqua, Pa, which was to take 50,000 tons of Hale ore each year for five years.

The Mountain Iron is at present the heaviest shipper on the Mesabi. Some sales of the No. 2 ore have been made by the Lake Superior Consolidated Mines as low as $2.10. As high as 8,000 tons have been taken from the Mountain Iron in a day.

Two bailers holding 1,000 gallons each are being used in unwatering the Dunn mine at Crystal Falls. The water goes down at the rate of 800 gallons a minute, and underground operations can be commenced in a few days.

Shoenberger, Speer & Co., of Pittsburg, have an option on the Sellers property on the Hibbing end of the Mesabi range.

An area of 160x80 feet caved in at the Canton mine on the Mesabi last week, the trouble being caused by one of the original test-pits, directly over one of the ore pillars.

At the Biwabik three steam shovels are at work and shipments will begin this week. After the close of the season a through cut will be made uniting the two cuts originally made. It is the expectation to have room and ore face for four steam shovels next year, and the through cut will make it possible to run in trains, load and haul out, without backing.

One ore crusher is being operated at the Champion mine. The opening is 24x24 inches. Forty tons of ore an hour is the amount now passed through the crusher.

THE E. W. Bliss Co., of Brooklyn, N. Y., have shipped within the last two weeks, besides many smaller tools, the following of their new improved trimming presses for trimming drop forgings and heavy hardware: One No. 73½ press with cut off attachment, two No. 74½, one No. 75 press. These were shipped to a large agricultural implement manufacturer. A 1,500-lb. drop hammer and a 600-lb drop hammer went to two large heavy hardware manufacturers in the Eastern States and a 400-lb. drop hammer and a 3¼ toggle drawing press, with a complete set of dies, to a large lamp manufacturing concern, also in the East. The works of the company are running full time with 460 men and with a number of large orders which they expect to ship within a couple of weeks, the outlook seems much brighter than for some time.

THE Wellston Iron & Steel Co., a new incorporation of Wellston, O., has recently purchased the Wellston furnace, and will start it up about Aug. 10, on foundry iron. The officers of the company are: J. C. Clutts, president; H. A. Marking, vice-president; L. C. Voglesang, secretary, treasurer and general manager, all of Wellston; and E. A. Hyde, 808 Medinah Building, Chicago, general sales agent.

THE Union Iron & Steel Co., held its annual meeting at Youngstown, O., July 24, electing the following directors: M. C. Wick, Henry Wick, John C. Wick, George D. Wick, Thomas H. Wells, Thomas Parrock, W. E. Taylor. The directors elected Myron C. Wick, president; George D. Wick, vice president; W. E. Taylor, secretary and treasurer.

THE DRIFT OF COMMENT.

Losses by the Railroad Strike.—While the losses incident to the recent railroad strike are sufficiently large to attract attention as well as to warrant a strong effort to prevent their recurrence, the figures commonly given are greatly exaggerated. Prominent among these amounts appear the decreased earnings of the railways, running in most cases into the hundreds of thousands for each road and aggregating millions of dollars. So far as the losses occurring from the interruption of traffic are concerned, the amounts given are in most cases purely hypothetical. They are as a rule based upon the traffic movement of the corresponding period in 1893. It is undoubtedly true that in passenger business considerable loss was occasioned to the railroads by the interruption of traffic on the one hand and the added expense of carrying on what little was done on the other, but a comparison with the travel of 1893 (world's fair year) is not fair for this purpose. With freight traffic however, the situation is altogether different. The earnings on this business are to a very great extent not lost but simply deferred. So far as perishable goods are concerned the freight on what would have been consumed during the period of the strike, had traffic been unimpeded, may be considered lost although even this is modified by reason of the enforced consumption of articles which were necessarily substituted for want of these. It is not probable that the earnings for the months of July, August and September will be materially decreased because of the strike. Net earnings will be somewhat reduced because of the added expense incident to the interruption of traffic as well as that of transacting a larger proportion of business within a shorter time, but it is not anticipated that the aggregate of the three months will be seriously affected.—[Railway Review.

Little Building West and South.—The West and South seem to have been more seriously affected by the business depression than the East. Especially is this true of the building industries, except in Chicago, where the average of aggregate expenditure has been fully maintained; other Western and Southern cities are far behind in the matter of new and projected buildings. Inasmuch, however, as the West is the great natural field of development we may safely prophesy that the betterment will come with a vim and a swish all the greater by reason of the momentary check. The westward sweep of the "course of empire" is not to be side-tracked by a bankers' panic, a miners' strike or a sugared Senate.—[Ornamental Iron, Chicago.

But Credit is not Scarce.—It is sometimes said that general trade is not more active because the merchants are not possessed of enough money to buy goods. Without stopping to consider the truth of this proposition, it may be said that if there is not sufficient money there is yet an abundance of credit. At no time in recent years has the rating of the average merchant been so good as it is at present. He paid his debts last year at a time when he had many inducements to evade them, and, as has been stated before, the mercantile classes owe less money today than at any time in their history. They have not strained their credit in the past and are not likely to do so now, and they will find when they come to buy goods more liberally that this promptness in payment has stood them in good stead. With this view of the case, there is enough money and to spare.—[Stoves and Hardware Reporter.

MAINE'S Commissioner of Labor Statistics has been making a canvass that shows something of the extent of the depression in that State. The 24 machine shops and foundries from which returns were received show the full working force to be 2,012. Of these only 862 are now at work, a reduction of 1,150 equal to 57 per cent. of the full working crews. The reduction in time amounts to 10 per cent. on the present working force, equivalent to four per cent. on full crews. The producing capacity has been reduced 61 per cent. The cut in wages, ranging from 10 to 20 per cent., affects 570 of the 862 now working, and amounts to a 7¾ per cent. cut on the present force on a basis of full crews. The total reduction in the earnings of this class of workmen amounts to 64 per cent. No class of foundry or machine work is exempt from the general depression.

MACHINE SHOP AND FOUNDRY.

WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, July 25, at 702 Western Union Bldg., Chicago, Mr. George M. Sargent, president, in the chair. Among those present were the following: G. M. Sargent, the Sargent Co., Chicago; A. W. McArthur, Rockford Foundry Co., Rockford, Ill.; William Francis, King & Andrews Co., Chicago; Thos. Snow, Challenge Wind Mill & Feed Mill Co., Batavia, Ill.; L. L. Trowbridge, Wells & French, Chicago; T. A. Wigham; F. B. Whitcomb; W. L. Lukens, Illinois Malleable Iron Co.; W. T. Warner, Illinois Central shops; J. Welch, Weir & Craig; O. T. Stantial, Illinois Malleable Iron Co.; W. Leahy, Wells & French; H. L. Hotchkiss, Wm. Deering & Co.; S. T. Johnson, Whiting Foundry Equipment Co.; Eugene W. Smith, Crane Co., Chicago.

Mr. O. T. Stantial, chairman of the test bar commitee appointed at the last meeting, reported that the committee is still working and expects to be able to report at the next meeting.

The following resolution, as presented at the last meeting of the Association, came up for decision:

Resolved: That Article IV of the by-laws be amended to read as follows: "The dues of the Association shall be an admission fee of five dollars ($5), and ten dollars ($10) per annum, paid quarterly, in advance."

After considerable discussion the resolution was passed.

The following resolution, as presented at the last meeting of the Association, came up for decision:

Resolved: That Article I of the by-laws be amended to read as follows: "The regular meetings of the Association shall be held bi-monthly, at such time and place as the Executive Committee may elect. Twelve members shall constitute a quorum."

After discussion the resolution came to vote and was defeated. The Secretary then read the paper of the evening, as follows:

An Economical Cupola.

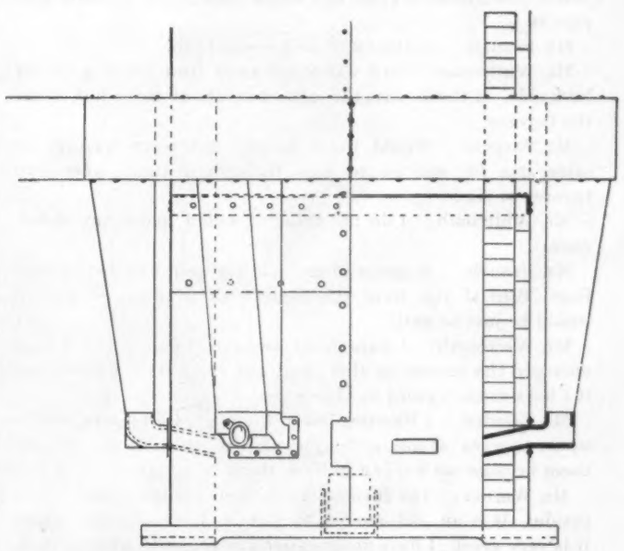
BY F. B. WHITCOMB.

At the May meeting of the Western Foundrymen's Association, a letter from the writer was read, in which was given a short description of the workings of a cupola erected under my directions at Beloit, Wis., for the Eclipse Wind Engine Co. I was at that time requested to give you a more detailed description of the cupola, and I take pleasure in doing so.

The cupola was built in 1885, and when first lined was bricked up to 40″, but as the heats increased in size the brick was carried up to 45″. For blast, a No. 6 Sturtevant fan was used, placed about 12 feet from the cupola. The air pipe ran straight through to the air chamber around the cupola, and was considerably larger than the outlet of the fan. The air chamber was several feet above the tuyeres, and the pipes running from the air chamber to the tuyeres were 11″ by 10″ at the first point, and graduated down to 5″ by 10″ at the tuyeres. The tuyeres were four in number, 2½″ by 9″, the longest way horizontal. The tuyere on the right hand and in front was placed 13″ above the bottom of the cupola, and the other three 13½″ above, so that the man that tapped out could watch the lower tuyere at any time the iron should be near it. In running through the lining, the tuyeres were inclined a little toward the bottom. The cupola was 10′ 6″ long from the bottom to the bottom of charging door, and the slag was about 1½″ below the tuyeres. I superintended this foundry for four years and a half, and ran the cupola for a little over three years of this time. The heats varied from four to sixteen tons, and during one year of the time I was in charge the average melting for the year was 11⅝ pounds of iron to one pound of coke. The best melting for a single heat in that time was 14 to 1. The work done was in wind-mill castings, pulleys and engine castings—from light snap work to castings weighing more than five tons. There was no indicator attached to tell the blast used, so I am unable to give it.

I do not think we can use the same amount of blast pressure on all cupolas. Take for instance the cupola described above, with air pipe and tuyeres larger than are used generally. They will let the air escape freely, and show less pressure on an indicator than a cupola with less tuyere surface that would confine the air more. Light coke does not require as much blast as heavy coke. I have used but two kinds of American coke that I could rely upon: Connellsville and New River. Connellsville is heavier than New River and will stand more blast. I used English coke one year in San Francisco, and found it to be a good deal like New River, and an excellent fuel.

My four-ton heats usually took 40 minutes to melt from the time the blast went on until the bottom was dropped. The larger heats ran about 7½ tons an hour. The iron would commence to melt in about six or seven minutes after the blast went on. For the bed, I filled to 23″ or 24″ above the tuyeres with coke, then put on 2,500 pounds of iron. The balance of the charge was from 6 to 7 shovels of coke to about



1,200 pounds of iron. The cupola was fired about an hour and a quarter before the blast went on. In heating, when the fire was started, coke was put in to cover above the tuyeres, and when that was fired through the balance of the bed was put in and charged until the cupola was full. In charging, I am always very particular to get the coke as even as possible. If there is any difference, I favor the sides instead of the center with the most coke. I am satisfied that in many foundries more coke is used than is necessary. Where too much coke is used, iron will not melt as fast, and to melt iron with little coke, it must be done quickly. Use enough to make the iron hot, and after that is done every pound added does more harm than good.

In conclusion I will state that the best feature of this cupola was in the free way it received the blast. From the experience I have had and were I to put up another, I would make a change in the tuyeres, making them 2″ by 12″ instead of 2½″ by 9″, to give more space around the side for the air to enter and be distributed inside more equally. For larger cupolas than the one I have described I would use six tuyeres instead of four. It is better, also, to have a little more blast than is necessary, than not to have enough; for it is always easy to shut off some while it is hard to increase it.

Discussion.

Mr. Sargent: This is the kind of cupola that has given you the best results, is it not?

Mr. Whitcomb: Yes for the same amount of fuel.

Mr. Sargent: I would like to ask, for information, how much iron should be melted to the pound of coke as a usual thing in good cupolas? What is the average?

Mr. Stantial: That is, according to the heat. In ordinary practice from 1 to 8 or 1 to 9 is fair. I have known cases where it has been 1 to 13½.

Mr. Whitcomb: Almost every heat will vary a little from the average.

Mr. Stantial: In ordinary foundry work it would be 1 to 8. Was your coke weighed?

M. Whitcomb: Yes, sir. The iron was weighed also.

Mr. Stantial: The average charge was 10 tons?

Mr. Whitcomb: Yes, I think it would average 10 tons. Some heats would run as low as four tons, and sixteen was the largest.

Mr. Snow: What kind of a cupola was this; an ordinary cupola or a patented one?

Mr. Whitcomb: An ordinary one. There is no patent on it.

Mr. Francis: If more tuyere surface is advisable, would you not have more tuyeres rather than enlarge the ones you have?

Mr. Whitcomb: I think the results would be the same if there were more tuyeres, but it is a little easier to have fewer tuyeres. Four tuyeres for a cupola of that size I think is about right.

Mr. Francis: Is there any advantage in having the draft pipe above the tuyeres?

Mr. Whitcomb: I do not know exactly how high that pipe is.

Mr. Francis: In the cut it looks very high.

Mr. Whitcomb: That was to get away from the slag on the back side. I think that the pipe was about three feet above the tuyeres.

Mr. Sargent: Would there be any difference, having the same area for the air to pass through, if there were four tuyeres or six?

Mr. Whitcomb: I do not think it would make any difference.

Mr. Francis: It seems to me that six would be better than four. Still, if you have the same area in four, perhaps it would be just as well.

Mr. Whitcomb: I have built several cupolas, and I have enlarged the tuyeres in that way, and every time I have done it I have made a point by doing so.

Mr. Stantial: I like the lower tuyeres I do not believe in upper tuyeres at all, although we use them now. We use them because we happen to have them.

Mr. Warner: The furnace I use has a continuous tuyere inside. It is an old one—a McKenzie, I believe, and I think it is very good. I have never experimented as to what I can do with it, but I shall try now. I melt about 1 to 9.

Mr. Wigham: You make the assertion that you could run more tuyeres on a similar sized cupola, Mr. Whitcomb?

Mr. Whitcomb: On a larger sized cupola.

Mr. Snow: I have kept track of the actual cost of running our foundry for three years, and we must have had some pretty poor foremen. We average about four tons, and 6½ is about the best we have ever done. The heats are all the way from 2¾ tons to 5 tons.

Mr. Stantial: That is not bad for that sized heat.

Mr. Francis: I would like to have an expression of opinion on upper and lower tuyeres.

Mr. Smith: Mr. Whitcomb says that he used from six to seven shovels of coke to 1,200 lbs. of iron. I would like to ask him how he weighs the coke.

Mr. Whitcomb: All the coke that was taken on to the scaffold was weighed, and what was not used was weighed back.

Mr. Smith: It looks to me that six or seven shovels of coke is a very thin layer to put between 1,200 lbs. of iron. It is a question whether it is advisable to economize so much on fuel as to melt 15 to 1, and to lose in other directions.

Mr. Leahy: My experience has been with a patent cupola, and our average melting is about 10 to 1. We use a Colliau cupola.

Mr. Snow: What is your average heat?

Mr. Leahy: About 60 tons.

Mr. Hotchkiss: We have a Colliau cupola, and we melt about 70 or 80 tons a day. We are melting to-day 13 to 1. We have melted 14 to 1 and run weeks at that. With 20-ton heats we would probably run from 12 to 13 to 1.

Mr. McArthur: We use the Colliau cupola and melt about 17 tons. Now we are running about five or six tons daily. I count myself very lucky with small heats if I get 5½ to 6. On large heats I am well satisfied with 10, or even 9. We use Connellsville coke. I do not see how we can set any average that will do for all work and all foundries. My work runs from pieces that weigh ¼-lb. to castings that weigh six or eight tons in the same heat. I will say that on an average run from 12 to 16 tons, 1 to 10 would be all I would expect to make. I would like to ask Mr. Whitcomb what his object was in inclining the tuyeres down?

Mr. Whitcomb: To keep the blast to the bottom.

Mr. McArthur: Suppose you were to run your iron pretty well up, would it not have an effect upon the iron?

Mr. Whitcomb: I do not think it would. We had very hot iron.

Mr. Welch: We have not been melting much iron lately. Our usual heat is from 5 to 10 tons, and I think we run from 10 and 11 to 1. The cupola is small, 36″.

Mr. Whitcomb: The higher the tuyeres are the more coke you have to burn. There is more burning surface. In this cupola the fan was placed on the top of the core oven, which was eight or nine feet high; that would bring the fan up probably 10 feet; and the blast pipe was inclined right down until it came to the air chamber.

Mr. Stantial: If I am not mistaken in our cupola, melting from 13 to 14, the fan is from 400 to 500 feet from the cupola.

Mr. Snow: That is only a question of power.

Mr. Whitcomb: I have always been pretty strongly impressed that the nearer the fan is the better.

A vote of thanks was extended to Mr. Whitcomb for his paper, and the meeting then adjourned.

THE CAMERA IN THE FOUNDRY.

Reference was made in these columns some time ago to the photograph gallery which the Gisholt Machine Co. had fitted up in connection with its plant at Madison, Wis., and to the arrangement by which the shop crane ran into the gallery, so that new machines which it was desired to photograph could be readily run into place before the camera. The *Iron Age*, commenting on the value of the camera as a means of preserving a record of work in the foundry says:

"This is illustrated in the case of the Builders' Iron Foundry, of Providence, where the camera has a wide application and where its importance is recognized. An outline of some of the work it does may be of interest. We will suppose that a blow hole has been brought to light in a steel casting received from another concern. When received the casting appeared to be perfect, but the machining showed the defect. The photograph showing this defect proves to the works who furnished the casting that it was imperfect, and they are as satisfied as if they had the casting at hand to examine. While a large casting was being drilled the drill broke, the machinist claiming that it entered a blow hole and was deflected. The piece was split through the hole, which was carefully cleaned of oil and chips and then photographed. This picture, sent to the foundry where the casting was made, saved all dispute, since the story it told was accepted without hesitation.

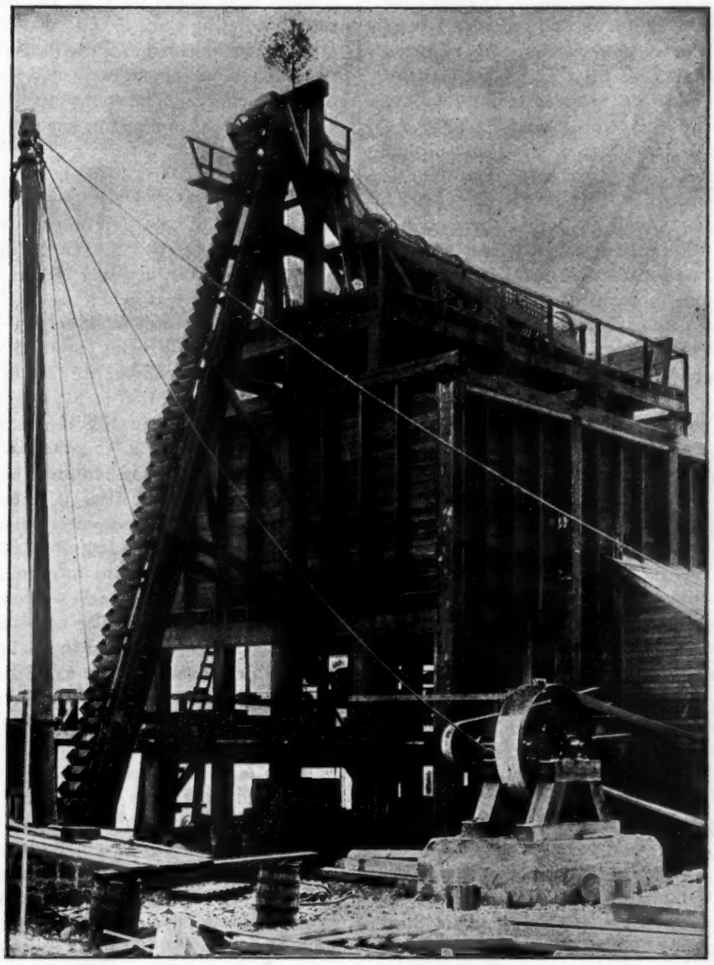
"In their own castings the Builders' Iron Foundry have found the camera to be of value. If a defective casting comes from the mold it is photographed. If this defect appears repeatedly in the same place it proves that there is something wrong with the method of doing the work. A close study of the subject points the remedy and there is no trouble with that particular job in the future.

"Perhaps one of the most important parts played by photography in these works is in obtaining a record of a difficult piece of work as it advances. Each step in the making of an intricate casting is photographed, this collection of pictures forming a sort of progress sheet that shows the method in perfect detail. If this casting is to be duplicated six months afterward, the pictures are all sent to the foreman of the foundry. They recall to his mind the exact way in which he formerly did the work and serve to solve any doubts he may have as to the correct course to pursue. They also allow a possible successor to study closely the method of work prevailing in former times."

THE newly incorporated Youngstown (O.) Iron & Steel Co. has elected as directors John O. Pew, Charles Pew, Mason Evans, G. M. McKelvey and L. E. Cochran. The directors elected L. E. Cochran, president; G. M. McKelvey, vice president; Charles Pew, secretary and treasurer; John O. Pew, general manager. The necessary machinery will be purchased at once, and the plant will be in operation in 60 days.

ELEVATOR FOR CRUSHED MATERIAL.

The accompanying illustration represents the Jeffrey stone elevator, which finds general application for the handling of crushed stone, ore, broken coal, and the like. The cut shows the elevator used in connection with a stone crusher receiving the product directly from the delivery chute and discharging it into a revolving screen at the top. The elevator is constructed of two strands of steel chain covered with a continuous line of buckets, which prevents the gritty material from coming in contact with the chain and the other principal parts of the machinery, thus greatly increasing its life. The buckets are made of heavy steel with riveted seams in all sizes to suit the capacity. The peculiar shape of these buckets makes it possible to operate the elevator at a very slow speed, at the same time effecting a cleaner discharge than is produced by the high speed machines, to say nothing of the wear and tear. At suitable intervals wrought iron cross bars are attached to the chain carrying rollers at each end, extending outside of the buckets, which support the weight of the chain, buckets and the material. This causes a rolling friction, reducing the strain on the machinery to a minimum, and requiring the least possible amount of power.



ELEVATOR FOR CRUSHED MATERIAL.

The Jeffrey Mfg. Co., of Columbus, O., are prepared to furnish these machines in sizes to suit all requirements, and will correspond with interested parties and submit estimates on application.

THE production of pig iron in Germany in May amounted to 468,981 metric tons, an increase of 12½ per cent. over May of last year. For the five months ending May 31st the output was 2,177,149 tons, an increase of 184,662 tons, or about 9½ per cent. over the corresponding period in 1893. Of the output in May this year 143,181 tons are classed as forge iron, 68,639 tons as foundry iron, 44,017 tons as Bessemer pig, and 215,144 tons, or nearly 49 per cent., as Thomas iron, showing the large proportion of German pig iron which is converted into steel by the basic process.

DOLOMITE AS BLAST FURNACE FLUX.

In a paper before the Alabama Industrial and Scientific Society, Ed. A. Uehling answers the objections raised to the use of dolomite as a flux in blast furnaces and presents some of the advantages he finds in substituting it for limestone:

The dolomite which is most available in the Birmingham district is of exceptional purity, both as to the foreign matter it contains and as to the proportion of lime and magnesia carbonate of which it is composed, viz.: 55 per cent. of the former and 43 per cent. of the latter, with only 2 per cent. of foreign matter. The theoretically pure dolomite should be composed of 45.65 per cent. of carbonate of magnesia and 54.35 per cent. of carbonate of lime. The limestone of the district is vastly more irregular. While there are some ledges of exceptional purity, there are others that are entirely worthless for fluxing purposes. The worst feature of these irregularities is that the impure ledges make their appearance in all the quarries thus far opened. For this reason it has not been possible to get limestone that will average 96 per cent. in carbonate of lime and 94 to 92 and even down to 90 per cent. is not infrequently the average of whole shipments.

The relative values of the two available fluxing materials of the district are to each other as 88 to 102.19. That means that 88 tons of dolomite will do as much work in the blast furnace as 102.19 tons of limestone. Put into dollars and cents, this means that if dolomite can be bought for 60 cents a ton limestone is worth only 52 cents a ton; or, if limestone costs 60 cents, dolomite is worth 69.5 cents a ton.

There is only one valid objection that can be brought up against the use of dolomite as a flux in the blast furnaces, and that is that magnesium has less affinity for sulphur than calcium, and dolomite is therefore less efficient as a desulphurizer than limestone, to the extent that caustic lime is displaced by magnesia. This objection, however, becomes quite insignificant where the ores are practically free from sulphur, as is the case in the Birmingham district, especially when a considerable proportion of hard ore is used in the

mixture, the lime of which, in connection with what is contained in the dolomite itself, is ample to take care of the sulphur contained in the coke.

One-quarter to one-half dolomite has been used regularly in the Sloss furnaces for nearly two years, and at intervals as high as three-fourths has been put on with the best of results the ore mixture being half Hard and half Irondale at the city and from one-fourth to one-third brown with generally equal proportions of Irondale and Hard at the North Birmingham furnaces. The coke used contained considerably above the average amount of sulphur found in the average coke of the district. The iron was of as good a quality as could have been produced with all limestone as a flux, and the furnaces have worked more regularly than they did prior to the use of dolomite.

The assertion that the use of dolomite has a tendency to make light colored iron is not sustained by fact. Some of the most celebrated foundry irons are made with all dolomite as a flux. In fact there is nothing else used in the whole Lehigh Valley. The writer had used it for years, while in charge of the blast furnaces of the Bethlehem Iron Co., and experienced no difficulty in keeping the sulphur within the required limits, even with ores containing as high as 1.5 per cent. of that element. The Illinois Steel Co. are also using dolomite exclusively in the furnaces of their Joliet works. They are doing very good work and have no trouble with the sulphur whatever. The inefficiency of dolomite to carry off sulphur is probably very much exaggerated.

There are impure dolomites as well as impure limestones; but when of good quality, and used intelligently and without prejudice, it always gives good satisfaction. In addition to its superior fluxing power, there is decidedly less tendency to hanging with dolomite than with carbonate of lime. To C. A. Meissner belongs the credit of having first systematically tried dolomite with the Birmingham ores, and on the strength of the good results obtained, he has developed a quarry, but has not met with the success he deserves in introducing it at all the furnaces. It is certainly worthy of a trial, which if carried on without prejudice cannot help but result beneficially to all concerned.

CHANGES IN IRON FROM JARRING.

The theory of crystallization of iron and steel under continued heavy service has been challenged by many metallurgists in late years, and the contention has been that failures attributed to molecular changes ought rather to be assigned to original faults in the iron. The metallurgical department of the *Engineering Magazine* makes these comments on the subject, in line with the old time view;

That wrought iron and steel do crystallize under long-continued jarring seems to be the almost unanimous opinion of the profession and of the men who make and use machinery subject to such stresses. There is a possible alternative explantion of the failure of metal under these conditions, but unquestionably the weight of opinion, not only of the older authorities but also of the practical men, favors the crystallization hypothesis. The dicta of Wohler, Weyrauch, Fairbairn, and others, the experiments of Mr. William Metcalf, and much similar evidence, have been cited in its support. The writer has also been shown many letters from machine-shop managers and mill superintendents, all of whom believe that the fibrous cold-rolled iron or low-carbon steel, as used in battery stems, and worked up with special care, crystallize under the continuous heavy jarring in service. One metallurgist of experience writes on this head:

"You may object to my statement that wrought iron will 'crystallize'; but 15 years ago people did not dispute that statement as they now do. 'Crystallization' may not take place; but *something* happens to the iron—molecular disintegration or weakening of some sort."

This is rather non-committal, and is certainly safe. No one denies the fact that metals deteriorate more or less rapidly under trying conditions, as in the hard usage of the stamp battery and of parts of other machines most subject to vibration and jar. The question is as to the explanation; and as to that, if a vote of experts were taken on the crystallization issue there is no denying that the ayes would carry by a large majority.

A machine for testing the behavior of iron and steel under repeated shocks was devised and described by Mr. William Kent in 1879. The design was to test metals by repeated blows, numbering millions if necessary. The test-piece is a round rod of convenient length and diameter, and the blows are applied in the direction of the length, as in tension tests. A small nut serving as an anvil is screwed or otherwise fastened on the bottom of the rod, and an annular weight is caused to drop upon the anvil by rotating double cams. The weight of the drop being known and the height of fall being uniformly adjusted, each blow gives an impact of the same number of foot pounds. A revolution counter attached to the driving-shaft indicates the number of blows given. Mr. Kent's testing apparatus gives what might be called blows of tension; but it could evidently be modified so as to give blows of compression. In that case it would really be a miniature stamp-battery in which the number of drops could be increased, to save time, from the 60 a minute proposed by Mr. Kent, or the 90 to 110 per minute of fast-running batteries, to a speed that would only be limited by the tendency of the rapidly rotating cams to toss the tappets or not clear them. It might be objected that the difference in weight and size between such an apparatus and a regular battery might give different effects. The stamp-battery may itself, of course, be considered a sort of testing-machine on a large scale.

HARVEYIZING STILL AN OPEN QUESTION.

A new art is being developed in the United States with considerable rapidity, the art of making heavy armor. But apparently no one, however experienced or well informed he may be, knows yet what are the limits of thickness or of treatment. Last May an 18-inch armor plate was destroyed at the Indian Head proving ground by a single shot from a 12-inch rifle, the plate breaking into three pieces. The plate was of unequal section, that is, it was 15 ft. 11 in. long, 7½ ft. wide and 18 in. thick from the top down for 43 inches where it began to taper and at the bottom was only 8 inches thick. The destruction was so complete and so unexpected that it at once started the question if it was possible to get reliable results from Harveyized plates of such thickness and especially of unequal section. It was found on examination that this plate contained a very fine internal crack communicating with the surface somewhere, but so fine that it could not be discovered in inspection. The evidence that it had communcated with the surface was found in the fact that there was oil in this crack which must have got in in the process of oil tempering. The next step was a trial of a 17-inch plate which was attacked by the same gun; that is a 12-inch rifle with a Carpenter projectile weighing 850 pounds. The first shot, with a velocity of 1,410 ft. and a striking energy of 14,800 foot tons penetrated six inches and did not crack or bulge the plate. The projectile was broken up. The second shot, with a velocity of 1,858 ft., and a striking energy of 21,300 foot tons penetrated 10 inches. The point of the shell was welded in the plate and the body of it was completely demolished. A fine crack was developed extending from the shot hole to one edge of the plate, but it did not open and the plate was accepted. So the doctors were at sea again. Was the limit of reliable Harveyizing at 17 inches, or above it or below? The next step was the attack of another Harveyized 17 inch plate with the same gun and projectile. The plate was pierced like a cheese. Finally came the trial, last Friday, of an 18-inch plate similar to that demolished in May with the same gun; that is, it was 18 inches thick for the upper 43 inches of its width and tapered to eight inches at its lower edge. The first shot was with a Carpenter projectile weighing 850 pounds with a striking velocity of 1,465 feet and a striking energy of 12,666 foot-tons, The shot penetrated about eight inches, the point was welded into the plate and the body broken. No cracks were developed and the plate was not at all distorted. The next shot was a similar projectile with 397½ pounds of powder, a striking velocity of 1,926 feet and an energy of 21,880 foot-tons. The point of this shot was also broken off and welded into the plate. It penetrated about nine inches and cracked the plate, but as it did not get through the plate was accepted. So the question is still open as to how reliable Harveyizing is with very thick plates of irregular section.—[Railway Gazette.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

B. W. Underwood, 87 Board of Trade, Chicago, wants to buy a second-hand engine and boiler in first-class order. The boiler must be about 54x16 or 48x14, and the engine 10x16 or 12x18. The front and all fittings for the boiler are wanted.

New Construction:—

Plans have been completed for the proposed shops of the Cincinnati, Chicago & Mackinaw road at Van Werst, O.

At New Castle, Ind., a building 100x50 feet is about to be put up to manufacture a bicycle patented by Dr. A. Redding.

The contract for the new train shed of the New York Central road at Syracuse, N. Y., has been let to the Buffalo Bridge & Iron Works.

The Kansas City Car & Iron Works have purchased 14 acres of land in Armourdale, a suburb of Kansas City, Mo., and will begin at once to erect a plant.

The contract for constructing the Louisville, New Albany & Chicago shops at Lafayette, Ind., was let at $127,300. The structure is to be completed by Jan. 1.

The building of a stove foundry at Waco, Tex., is under consideration. H. J. Karges, of Evansville, Ind., and J. C. Gorham, of Austin, Tex., are interested.

The Lehigh Valley Transportation Co.'s plant at West Superior for storing coal will consist of two parabolic iron and steel buildings, each about 250 ft. in diameter and 100 ft. high, the one to store 150,000 tons of soft coal, the other one an equal quantity of anthracite.

The B. & O. Railroad Co., will build a power house in South Baltimore to furnish power for the Baltimere Belt tunnel. The building will be 69x300 feet. The roof will be corrugated iron and iron pillars will supports the several floors. The dynamos and engihes will have a capacity of 12,000 h. p.

Fires and Accidents:—

The wire works of Howard & Morse, Brooklyn, N. Y., were damaged $15,000 by fire.

At Perry, Ia., the largest boiler in the water pumping station and electric light plant exploded last week. Loss is about $15,000.

At Furnace I, of the Edgar Thomson Steel Works, Braddock, Pa., an explosion was caused by the loosening of an accumulation of iron and cinder on the side and its falling into the bosh. The bell was blown off and the contents of the stack hurled in all directions. Several workmen were burned.

Additions, Enlargements, Removals, Etc.:—

The Vulcan Iron Co., New Castle, Pa., are building a large extension to their pattern house.

An extension 40 ft. x 60 ft. will be added to the Bloomsburg Mfg. Co.'s plant at Bloomsburg, Pa.

Harlan & Hollingsworth Co., Wilmington, Del., will erect as additions to their plant a pattern and molding shop 63x254 feet, two stories high, of iron, to cost $20,000, and a one-story frame blacksmith shop, 37x150 feet, to cost $3,000.

The Andrews Bros. Co., of Haselton, O., are reported to be planning another sheet mill. A cold rolling train will also be put in at their plant. They have recently received new squaring shears, weighing 18 tons, cutting 126 inches of half-inch iron at a stroke.

The Hamilton Construction & Tool Co., of Hamilton, O. are in communication with citizens of Sault Ste Marie, Mich. with reference to removal to that place. Ice tools and ice elevating machinery, bridge work and the manufacture of refrigerating cars are the lines of the company.

The removal of the Girard (O.) Stove Works to Youngstown is now in the hands of a committee of the Board of Commerce of Youngstown. The company already have an option on the Miller foundry plant at Youngstown and all that is asked of the Board of Commerce is that it raise $1,500 for the purchase of a lot adjoining the foundry. It is proposed to operate the Miller foundry for jobbing, in connection with the stove works.

General Industrial Notes:—

Two additional blast furnaces of the Cambria Iron Co. have started.

The Pittsburg Steel Casting Co.'s plant will be closed for a few weeks to make repairs.

The Bethlehem Iron Co. had all departments in operation last week and 3,000 men were at work.

The Sterling Steel Co., McKeesport, Pa., have no intention of entering into the manufacture of armor plate.

James B. Clow & Sons' pipe works at New Philadelphia, O., idle the past year, are about to start up again.

Iron work for a large sugar refinery, building in Cuba by Hugh Kelly, has been shipped by the Pittsburg Bridge Co.

The Pittsburg Bridge Works have received a number of Vanderbilt orders recently, and have put their men on full time.

The Excelsior Machine & Cleveland Punch & Shear Co. have changed their corporate name to the Cleveland Punch & Shear Co.

The Rogers Foundry & Stove Co., Belleville, Ill., manufacturers of stoves and machinery castings, have made a voluntary assignment.

Ore handlers at the Carrie Furnace, Rankin, Pa., who asked an increase from $1.05 to $1.35 a day, have returned to work at the old rate.

The establishment of malleable iron and steel works at Toronto, Ont., is proposed, the promoters being capitalists from the States.

The Monongahela Iron & Steel Co., Hays Station, Pa., are paying the scale in their puddling department but do not recognize the union.

The litigation in which the Maumee Rolling Mills, Toledo, O., have been involved is to be terminated by the sale of the plant at public auction Sept. 1.

The New Castle Steel & Tin Plate Co., New Castle, Pa., have lately installed two 18 foot boilers, 84 inches in diameter, and are now running six mills full.

Oliver Wire Co. is the name which the Oliver & Roberts Wire Co., of Pittsburg, will ask the State of Pennsylvania to substitute for its present name.

The Mahoning Valley Iron Co., Youngstown, O., have been putting in new machinery to expedite increasing orders for the Daniels Steel Tie Co.'s product.

The wire nail and rod departments of the American Wire Nail Co., at Anderson, Ind., have resumed operations for the coming year, putting 400 men to work.

The 24-inch mill of the National Tube Works, at McKeesport, idle for a year, was started Monday. Over 300 men were given work. A number of additional men were also put on at the rolling mill.

The Rosena furnace at New Castle, Pa., blew in July 21, and the Atlantic furnaces resumed last week. The Shenango Valley steel mill, which has been idle for several months, started up on Monday.

The Giesy Foundry & Machine Co. has been incorported at Salt Lake City, Utah, with a capital stock of $10,000. Sidney W. Drake is president, James Moffatt vice president, Wm. S Giesy secretary, Emery Ward treasurer.

The Laird & Sweeney Mfg. Co., St. Johnsbury, Vt., recently shipped to Billings & Spencer, Hartford, Conn., a 25-pound power hammer designed to run 500 strokes a minute. They are building a 100-pound hammer for the Fairbanks Scale Works, to run 250 revolutions a minute

The Berlin Iron Bridge Co., of East Berlin, Conn., have received the contract from M. C. Henry & Co., of New York, to cover their stone yard with an iron roof, and also for a traveling crane. The building will be 50 feet in width and 100 feet in length, constructed entirely of iron, the whole space to be controlled by the traveling crane.

F. E. Myers & Bro., Ashland, O., manufacturers of pumps and hay tools, report that while trade conditions and results have been unsatisfactory, they have run full force and will continue so throughout the entire year. They consider this substantial evidence that their products possess merit and have a trade reputation that is substantial.

Articles of incorporation have been filed for the Ogden Iron Mining & Mfg. Co., of Ogden, Utah. The company own nine iron claims in Weber mining district. The officers are: Maroni Poulter, president; A. F. Bratz, vice-president; O. A.

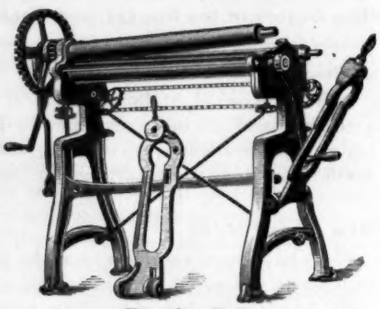
MACHINES FOR WORKING SHEET METAL

Patent Gap Shears.

Patent Gap Shears, Especially designed for Squaring, Trimming and Slitting. 6 to 18 inch throat for Slitting Wide Sheets. Complete for Tin or Iron to 14 gauge. Seven Styles of various lengths HAND AND POWER.

General Purpose Punch and Shear. Seven Sizes.

Rear Side.



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General Purpose Forming Rolls, all sizes. Quickly adjusted and instantly opened—A Revolution. Also Patent Crimping Rolls. Beware of Infringements.

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STEAM SHOVELS In Five Sizes for Railroad and Contract Work, Brick Yards, Stone Quarries, Stripping and Handling Iron Ore, Coal, Etc.

STEAM DREDGES Of All Types and Sizes; for All Purposes; Elevator, Dipper, Clam Shell, Suction. Special Machines for Special Work.

WRECKING CARS BOTH HAND AND STEAM. CAPACITIES 10 TO 35 TONS.

PILE DRIVERS WITH EITHER DROP OR STEAM HAMMERS.

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FIRE BRICK, FIRE CLAY,

For Blast Furnaces, Cupola Lining, Boiler Setting, Smoke Stack Lining, or Any Other Purpose.

EVERY CLASS OF SPECIAL SHAPES AND SIZES.

ALL KINDS OF

Foundry Supplies.

FACINGS, BLACKINGS AND MOULDING SANDS

Of All Kinds.

Kennedy, secretary, and C. S. Pulver, treasurer. These with John Junker, Joseph Tyrrell and C. A. Bedford constitute the board of directors. The organization is the result of an effort to consolidate all desirable iron properties in the vicinity of Ogden, in the hope that such action may lead to starting up the old iron works which were once successfully operated in that city.

That 90 per cent. of the creditors of the Pennsylvania Steel Co. and Maryland Steel Co., have assented to the reorganization plan, is the statement made by the committee. The plan of judicial sale is adopted and the amicable adjustment abandoned. The time for subscription by all stockholders to the new preferred stock is extended until October 1 next. Stockholders holding the present common stock who do not avail themselves of this opportunity will then be wiped out, as the company will now be reorganized for the benefit of the creditors and subscribers to the new preferred stock to the amount of $1,500,000 only.

The Michigan-Peninsular Car Co. are now employing about 600 men at their Detroit shops, more than half of this force having been taken on within the last week or two. It is thought that the Peninsular Car Works will also be started up soon, and that the force will be gradually increased during the month of August until 1,000 men are working. How long the shops will remain open depends of course on what contracts the company secures. At present it is working on a few small orders, the largest being for the Lake Shore & Michigan Southern, and the officers say that the outlook for new contracts is not very encouraging.

Mid-Summer Magazines.

The first number of the *New Science Review*, a quarterly from the press of the Transatlantic Publishing Co., 147 N. Tenth st., Philadelphia, has been received. The announcement made by J. M. Stoddart, the editor, explains that the new periodical is to occupy "a position midway between the ponderous scientific journals and the lighter magazines," without conflicting with any. In this initial number there are articles on the "Mystery of the Ice Age," "Thomas Paine and the Republic of the Mind," "Scientific Creation," "The Problem of the Pole," "Nikola Tesla and His Works" and other subjects of scientific interest.

An interesting controversy on woman suffrage is the feature of the *Century* for August. Senator Hoar appears as the champion of those who seek the ballot, while Rev. Dr. J. M. Buckley points out what he considers the grave perils of extending the franchise to the weaker sex. The fiction of the number is excellent and abundant.

Outing for August is an interesting number, profusely illustrated. A feature is the article on the New York Yacht Club by Capt. A. J. Kenealy. Camping, hunting, fishing, cycling, all are represented in entertaining sketches and stories.

Scribner's Magazine for August is a fiction number, as has been the custom for seven years. It contains six complete short stories, by H. C. Bunner, T. R. Sullivan, William H. Shelton, W. Graily Hewitt, Octave Uzanne, and Harrison Robertson, the author of one of the most famous stories ever published in *Scribner's*, "How the Derby was Won."

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Proprietors of the CELEBRATED Mount Savage Fire Brick.

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Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

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The Simplest, Cheapest and Best Machines in the Market. Pulverize wet or dry to any degree of fineness. Makes little or no slimes in wet nor dust in dry work. Four sizes, capacity from 2 to 60 tons per day.

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Cable Address, American.

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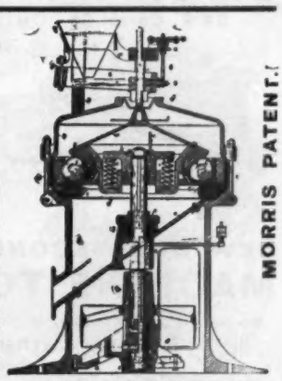
Office of THE CLEVELAND IRON ORE PAINT CO. and THE GARRY IRON ROOFING CO.,
CLEVELAND, O., Jan. 25, 1894.

The American Mining & Milling Machinery Co., Cleveland, O.:

GENTLEMEN: We purchased a No. 2 American Rock Breaker and a No. 2 American Ball Pulverizer from your company about one year ago. The latter part of April, 1893, we started up for regular work, since which time we have run both of said machines to the full extent of our demands and to our entire satisfaction. The first 700 tons of hard iron ore that we pulverized for paint purposes was ground without taking the Pulverizer apart, and without expending one dollar for repairs for either of these machines. Of the 700 tons spoken of, about 200 tons was Lake Superior Specular iron ore, containing some 70 per cent. iron; a very difficult ore to pulverize. The remainder was a red fossiliferous iron ore, carrying quite a per cent. of silex, which cuts out buhr-stones rapidly. We find that the steel balls, which were when new 5 in. in diameter, now caliper 4⅞ in., and are perfectly round and smooth. The grinding track shows very little wear, and the driving track shows LESS; in fact, the wear is almost imperceptible. These two machines crush and pulverize more than one ton per hour with LESS than 12 H. P. We do not know of any Crusher or Pulverizer that can compare with the output of these two machines in quantity, quality, small amount of wear and tear, and like power. In our opinion, you cannot recommend them too highly. Very truly yours,

CLEVELAND IRON ORE PAINT CO.



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MECHANICS, Mechanical Drawing, Architecture, Plumbing, Heating and Ventilation, Electricity, Railroad and Bridge Engineering, Surveying and Mapping, Mining and The English Branches. Send for FREE Circular of Information, stating subject you think of studying to **The Correspondence School of Mechanics & Industrial Sciences, Scranton, Pa. 4500 Students.**

SUBSCRIBE FOR

THE IRON TRADE REVIEW.

Reduced Rates to Denver.

Unusual low-rate excursions are being announced this year by the Pennsylvania Lines, and long distance journeys over them may be made at slight expense. For this summer exceedingly cheap excursions to Denver will be run over these lines. The rates will be the lowest in effect for years and will enable persons to visit the West at slight cost. The dates and return limits for these special Denver excursions will be as follows:

On August 9th and 10th, account annual meeting League of American Wheelmen, good returning until the middle of September.

Although the low rates have been made for meetings of organizations, the sale of tickets will not be confined to members, but the public generally may take advantage of the low fare. The return limits will be ample for side trips in the West. Details may be obtained by applying to any ticket agent of the Pennsylvania Lines, or by addressing F. Van Dusen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

Have You Heard About

"Summer Outings" descriptive of picnic and summer resorts along the line of the Nickel Plate Road; "Country Homes," a list of, open to summer boarders, located on the Nickel Plate Road, adjacent to the south shore of Lake Erie; "Summer Tours," an illustrated and descriptive folder of famous resorts in the East; "Red Book," gives routes and rates for summer tours, issued by the Nickel Plate Road? If you desire copies mailed free address B. F. Horner, General Passenger Agent, Cleveland, O.

Summer Tours.

The Nickel Plate Road has placed on sale a complete line of tourist tickets to the resorts of the East, including Niagara Falls, One Thousand Islands, Lower Canada, the Atlantic Coast, and the Mountains of New York and New England. Address B. F. Horner, General Passenger Agent, Cleveland, O., for descriptive matter and full information.

Country Homes

Is the title of a pamphlet issued by the Nickel Plate Road, giving a list of places open to summer boarders along the south shore of Lake Erie. Write for a copy.

Chautauqua Lake Free, August 20th

In connection with a $3.00 Niagara Falls excursion ticket via the Nickel Plate Road. Cleveland Ticket Offices 224 Bank st., 534 Pearl st., and depots.

SOME changes in officers were made at a recent meeting of the stockholders of the Weston Furnace Co., at Manistique, Mich. J. D. Mersereau, formerly treasurer, was elected president; M. H. Quick was made vice-president; W. H. Hill, formerly vice-president, was made treasurer; and H. Duvall, secretary, was re-elected.

FORMAL notice is sent out, that the firm of Schleicher, Schumm & Co. has been dissolved by limitation, James Schleicher withdrawing. The business has been transferred to "The Otto Gas Engine Works," incorporated, and will be carried on by it at Philadelphia, as heretofore.

Making Manganese Steel.

A method lately patented in England by Mr. R. A. Hadfield is described as follows: A heat of ordinary steel is made in any convenient manner; this steel is preferably low in carbon. The steel is then transferred to a ladle. Another ladle is hung from a Denison suspended weighing machine, and has poured or placed into it the necessary quantity of molten or heated ferromanganese of suitable percentage, according to the percentage required in the steel to be produced. There is then added to this as much of the ordinary steel as will increase the weight of the contents to that of the required quantity of manganese steel. In this way thorough admixture may be effected, but, if desired, there may be additional stirring. The admixture will then be ready for pouring into ingots or castings.

AUGUST 20th, excursion to Niagara Falls, $3.00 round trip via the Nickel Plate Road. Cleveland Ticket Offices, 224 Bank st., 534 Pearl st., and depots.

Linwood Park, Vermillion, O.

As a delightful Summer Resort located on the shore of Lake Erie and during the summer season from June 15th to September 20th, the Nickel Plate Road offers reduced rates to that point.

$3.00

To Niagara Falls, August 20 via the Nickel Plate Road, 10 P. M. Chautauqua Lake free. Toronto $1.00 extra. 1,000 Islands $9.00. Cleveland offices, 224 Bank st., 534 Pearl st., and depots.

THE Nickel Plate Road runs its 12th Annual Excursion August 20th, at 10 P. M. $3.00 round trip. Cleveland Ticket Offices, 224 Bank st., 534 Pearl st., and depots.

SENECA Furnace of the Salem Iron Co., at Leetonia, O., will be put in blast the latter part of August. In rebuilding, the size has been increased to 17'x76'.

Dawson & Goodwin,
57 S. Canal St, CHICAGO.

DEALERS IN
NEW AND SECOND HAND MACHINE TOOLS.

We carry in stock a full line of
Engine Lathes,
Iron Shapers,
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Second-Hand Machinery.

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Acknowledged the best for Boilers, Forges, Furnaces, Ovens, etc. Write for Catalogues.

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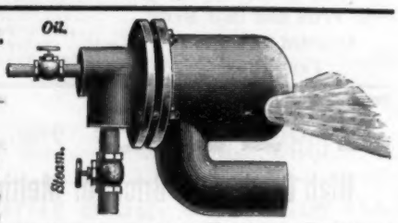

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Of all Shapes and Sizes.
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NO TAR. **ROOFING** NO TAR.

It is superior to any other roofing, and unequaled for House, Barn, Factory, or out-buildings; it costs half the price of shingles, tin or iron; it is ready for use and easily applied by any one; it is the best roofing in the market, in durability, to all others
Send for estimate, and state size of roof.

RUBBER PAINT.

The best known paint in the world for tin, iron or shingle roofs, fences, sides of barns and out-buildings. It costs only 60 cents per gallon in barrel lots, or $4.50 for a 5-gallon tub. Color, dark red. It will stop leaks in tin or iron roofs that will last for years. It is guaranteed not to peel, crack, scale, nor wash off and is fire-proof against sparks. TRY IT.

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20 TO 42 INCH SWING.

Lever and worm feed, back geared, self feed and automatic stop; with or without sliding head. (3)

COMPLETE LINE HIGH GRADE TOOLS.

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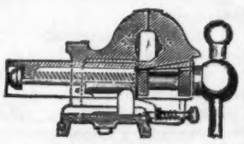
Patented Dec. 27, 1892.
IT HAS QUALITIES THAT ARE UNDISPUTED.

Rapid, Active, Prompt.

One movement in and out, one turn of the hand and the work is secured.



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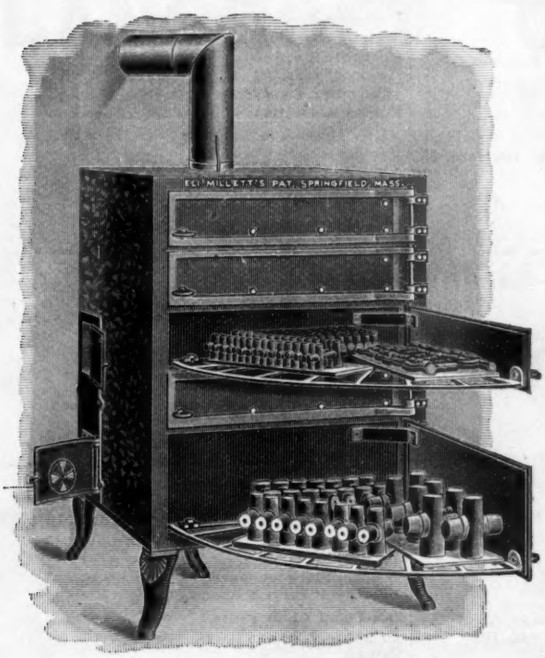
MILLETT'S PATENT PORTABLE CORE OVEN.



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Saves Fuel,
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Does More Work and Makes Better Cores.

If you make small cores you need it.

Write us for Circulars and Prices.

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SECOND HAND!

14x6 Ames Lathe, rise and fall carriage with chuck.
16x6 Prentiss Lathe, complete.
18x6 New Haven Lathe, screw feed.
16x16x4 ft. Pease Planer.
36x36x12 Pease Planer.
No. 1 Cincinnati Universal Milling Machine.
10" New Haven Shaper.
60" Niles Boring Mill.
Two 4-spindle gang drills.
1" wire feed screw machines.
No. 2 Brown & Sharpe Plain Grinder.
Cutter & Reamer Grinder.
Pond Index Miller.
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14x6 Blaisdell Engine Lathe.
18x6 Putnam Engine Lathe.
2-spindle Ames Profiler.
10"x10"x2' Hendey Power and Hand Planer.
No. 2 Kempsmith Milling Machine.

The above machines are complete and in good order. Most of them are the same as new.
Send for Photos, descriptions, etc.
Agents for Cincinnati Milling Machine Co., Bickford Drill Co., Windsor Machine Co., L. W. Pond Machine Co., Nicholson & Waterman, Ferracute Machine Co. and other first-class manufacturers.

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IRON ORE.

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Local Coke Foundry No. 2	10 00@ 10 25
Local Coke Foundry No. 3	9 50@ 10 00
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Local Scotch Foundry No. 2	10 00@ 10 50
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Tennessee Charcoal	15 50
Southern Soft No. 1	11 75
Southern Soft No. 2	11 25
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Southern Coke No. 2 Foundry	9 25@ 9 50
Southern Coke No. 3 Foundry	8 75@ 9 00
Gray Forge	8 50@ 8 75
Southern Charcoal No. 1 Foundry	12 50@ 13 50
Car Wheel	15 00@ 15 50
Spathite	11 25@ 11 75
ST. LOUIS (reported by Rogers, Brown & Meacham):	
Southern Coke No 1	$11 00@$11 25
Southern Coke No. 2	10 25@ 10 75
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	9 50@ 9 75
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	13 00@ 13 50
Ohio Softeners	14 00@ 14 50
Lake Superior	16 50@ 17 00
Southern	16 75@ 17 25
Connellsville Coke, St. Louis	4 20

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$12 00
Old steel rails	10 00
	NET TONS
No. 1 R. R. wrought scrap	$ 9 00
No. 1 wrought scrap	8 50
No. 1 Machine cast scrap	8 50
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	4 75
Uncut wrought iron boilers	3 00
Steel boiler plates	8 00
Grate bars	4 00
Pipes and flues (clean)	7 00
Tank iron	6 00
Hoop and band iron	5 00
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	7 00

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.
THE CADY MFG. CO.
283 W. River St., CLEVELAND, O.

AUTOMATIC MACHINERY.
Power Presses, Dies, Drop Hammers, Punches and Shears, Wire Straighteners and Cutters, Wire Forming Machines

PERFORATED METALS
OF ALL KINDS FOR
MILLING MINING AND AGRICULTURAL MACHINERY,
PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.
LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.
THE ROBERT AITCHISON. PERFORATED METAL CO.,
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

Horse AND Mule Shoes
SHEETS, BARS, SLABS AND BILLETS.
Light Sheets for TINNING AND PERFORATING a Specialty.
Geo. H. Sibell & Co., 614-218 La Salle St., Chicago.

FUEL OIL BURNERS.
J. R. Armstrong's System of Burning
Crude Petroleum.
WHY IT IS THE BEST.
Send for Catalogue.
JOHN R. ARMSTRONG COMPANY,
35 West Monroe St., Chicago, Ill.

A. H. LEITCH, PRES JOHN C. LEITCH, SEC. AND GENL. MAN. JOHN A. WILSON, TREAS.
WESTMORELAND FIRE BRICK CO.
MANUFACTURERS OF HIGH GRADE **FIRE BRICKS.**
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.
The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease
NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
An Interesting and Instructive Pamphlet will be sent Free of Charge.
JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.
CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.25C@1.35C
Angles	1.20C@1.25C
Tees	1.35C@1.45C
Universal Plates	1.25C
Sheared Plates	1.35C

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1¼ to 2 inch	1 50
1¼ & 1⅜ by ⅜ to ¾ inch	1 35
1 & 1¼ by ⅜ to ¾ inch	1 40
⅝, ⅜, ⅞, by ⅜ to ⅝ inch	1 50

Round and Square.

1 to 1⅜ inch	1 30
2 to 2⅜ inch	1 40
2¾ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4¼ to 4½ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1½ to 3 inch	1 85
⅜ to 1½ inch	1 65
⅝ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 40
1 to 1⅜ by ¼ and 5-16 inch	1 45
⅜ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1⅜, No. 13, 14 and 15	1 90
1⅛ to 1⅜, No. 16, 17 and 18	1 95
1⅛ to 1⅜, No 19 and 20	2 00
1⅛ to 1⅜, No. 21	2 10
1⅛ to 1⅜, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16. 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16. No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14 and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

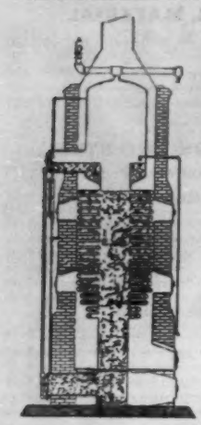
1½ to 6 by ⅛ to 3-16 inch	1 60
1½ to 6 by Nos. 11 and 12	1 65
1 to 1⅜ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅜ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95



THE ADAMS
WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co., }
Niles, O., Aug. 18, 1893. }

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

The Falcon Tin Plate & Sheet Co.,
By Warner Arms, Pres't.

C. P. ADAMS.
807 The Cuyahoga, - CLEVELAND. O.

C. W. HUNT COMPANY,
45 Broadway, New York,
MANUFACTURERS OF

Engineers' and Contractors' MACHINERY
For Hoisting and Conveying Purposes.

SECTIONAL TRACK, INDUSTRIAL AND CABLE RAILWAYS.
BARROWS, COAL BUCKETS, WIRE ROPE, TIP CARS, ETC.

STEEL CASTINGS

FROM 1 TO 40,000 POUNDS WEIGHT.
Of Open Hearth, Chester or Bessemer Steel.
True to Pattern. Sound. Solid.
GEARING OF ALL KINDS, CRANK SHAFTS, KNUCKLES FOR CAR COUPLERS.
Cross-Heads, Rockers, Piston Heads, etc., for Locomotives.
Steel Castings of every Description
CHESTER STEEL CASTINGS CO.,
WORKS: CHESTER, PA. } OFFICE: 407 LIBRARY STREET, - PHILADELPHIA, PA.

FRANK R. BIEDLER,

(PRINCIPAL)
Baltimore Offices,
Equitable Building,

(BRANCH)
New York Offices
Welles Building,
18 Broadway.

MINING MINERAL AND TIMBER LANDS.

Municipal Bonds,
Farm and City Mortgages,
Short Time Paper.

Large Tracts of Florida Phosphate and Hammock Lands.

EXAMINATIONS AND REPORTS MADE.

Correspondence Solicited.

The Iron Trade Review

Pays special attention to iron ore, blast furnace, rolling mill, foundry and machine shop interests. Per year **$3.00.**

Moffet Portable Drill

UNSURPASSED AS A REAMER.

Weighs 48 pounds and drills from ⅜ to 2 inches diameter.

Runs with Steam or Compressed air.
Will Work in Any Position.
An Economical Substitute for Rachet Drilling.
Send for Circular.

MANUFACTURED BY

J. G. TIMOLAT
89 and 91 S. Fifth Ave., NEW YORK.

No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25 26	2 50
No 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in.	09
3⅜ to 4 in	09½
⅝ to 11-16 and 4½	10
⅛ to 6 in	10½
¼ to 9-32 and 6⅛ to 7 in	11
3-16 in	13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to 5⅛ thick	8

Bessemer and O. H. Steel.

Machinery	base price, 1 80
Tire	" 1 85
Spring	" 2 20
Sleigh Shoe	" 2 20
Toe Calk	" 2 05
Cutter Shoes, tapered and bent	" 2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 70
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ lb 9@10
Wright's	℔ lb 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 35
Horton's Universal	dis 40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

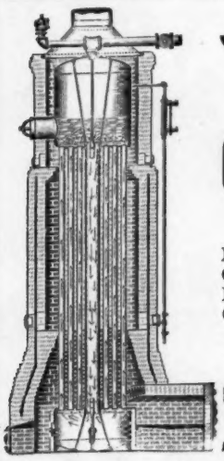
Cast Steel	℔ 3½
Iron, steel points	℔ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c



J. C. McNEIL CO.,

AKRON, OHIO,

SOLE BUILDERS OF THE

Cook Patent Water Tube Boiler

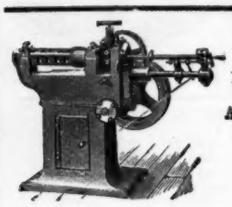
THE ONLY PERFECT WASTE-HEAT BOILER.

No incrustation.
Generates the greatest amount steam with least amount heat.
Repairs reduced to a minimum.
Can be used equally as well for direct firing or with natural gas.

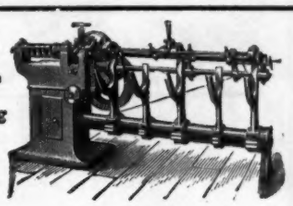
WE ARE ALSO BUILDERS OF

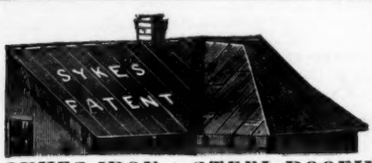
HORIZONTAL, TUBULAR, AND FLUE BOILERS, OIL TANKS AND WATER STAND PIPES.

☞ Estimates furnished promptly on receipt of specifications.



JOHN ADT & SON,
New Haven, Conn.
Builders of Machinery for Hardware Manufacture.
Automatic Wire Straightening and Cutting Machines, Butt Milling Machinery, Butt Drilling Machinery, Riveting Machines, Foot Presses, Sprue Cutters, Etc.





WORLD'S FAIR AWARD.

We are the only Steel Roofing Co. awarded Medal and Diploma for **PATENT CAP ROOFING** at World's Columbian Exposition. We are also large manufacturers of all styles of METAL ROOFING, SIDING, CEILING, ETC. Send for Catalogue and Price List. Mention this paper.

SYKES IRON & STEEL ROOFING CO., - Chicago and Niles, O.

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 6c@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 6c@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 6c@70
Vulcanite	dis 60&10
Hamden	dis 60&10c@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F.	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs.	12c
" " " over 5 lbs.	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¾	3⅛
Hexagon	15½	11½	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₱ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₱ keg card rate	
Car lots	$1.10
Less than car lots	$1.75

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz	dis 10@10&10

FIRST MORTGAGE 15-YEAR SIX PER CENT. GOLD BONDS WITH SINKING FUND

OF THE

BLUE RIDGE IRON COMPANY

OF VIRGINIA.

BLUE RIDGE IRON COMPANY. } CONSOLIDATED.
CRESCENT IRON COMPANY. }
LILY AND CRESCENT MINES.

Dated March 31st, 1894. Due April 1st, 1909

Interest Payable April and October.

GUARANTEED TO APRIL 1st, 1899

—BY—

THE FIDELITY AND DEPOSIT COMPANY OF MARYLAND,

TRUSTEE FOR BONDHOLDERS.

Both Principal and Interest payable in Gold Coin at the office of the Trustee, Baltimore, Md.

TOTAL BONDED DEBT, $50,000.00. **CAPITAL STOCK, $300,000.00.**

GENERAL OFFICES: EQUITABLE BUILDING, BALTIMORE, MD.

Mines and Local Offices: Stanley, Page Co., Va.

Bonds Issued to Improve Mines and Increase Output.

OVER 1,000,000 TONS, ESTIMATED, HIGH-GRADE BROWN HEMATITE ORE.

N. & W. Ry. at Mines, Connecting Direct to the Great Iron and Steel Manufacturing Centres of Virginia, Pennsylvania, Ohio and Maryland. For Prospectus and Description, with Expert Analysis of Ores, Address

ANDREW MAYER,

Investment Banker, 18 Wall St., NEW YORK CITY.

Packing, Steam.

Boston Belting Co.	dis 60
American Packing Hemp	℔ lb 9@10
Russia " "	℔ lb 14
Italian " "	℔ lb 13@19
Plumbago Piston	℔ lb 40
Peerless	℔ lb 60
Morrison's "	℔ lb 45
Square Flax "	℔ lb 50
Sheet Rubber	℔ lb 12&24
Excelsior Rubber	℔ lb 48
Rainbow { Full Rolls	45c ℔ lb
Rainbow { Less than Full Rolls	50c ℔ lb
Eclipse Gasket	℔ lb 75

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	32c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 6(
Parker's	dis 20@2(
Prentiss	dis 20
Stephen's	dis 25@3(
Barrett's	dis 3(
Miller's Falls	dis 4(
Merrill's	dis 15@2(
Howard	dis 3(

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ℔ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

SPECIAL LOW RATES

—VIA—

BIG FOUR ROUTE

FOR FOLLOWING MEETINGS

League of American Wheelmen

DENVER. August 13-18.

KNIGHTS OF PYTHIAS,

WASHINGTON, D. C., in August.

G. A R. at PITTSBURG,

September 10-15.

Ask nearest Agent for Date of Sale, Return Limit, Routes, Train Service, etc.

E. O. McCORMICK, Passenger Traffic Mgr. D. B. MARTIN, Gen'l Pass. & Tkt. Agt.

CINCINNATI.

STEEL, IRON, COPPER, ZINC, BRASS, TIN,

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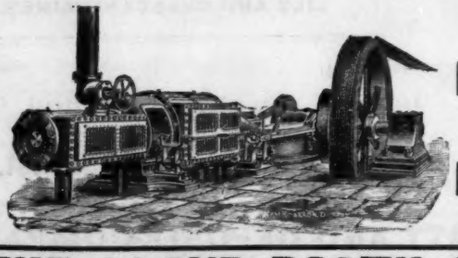

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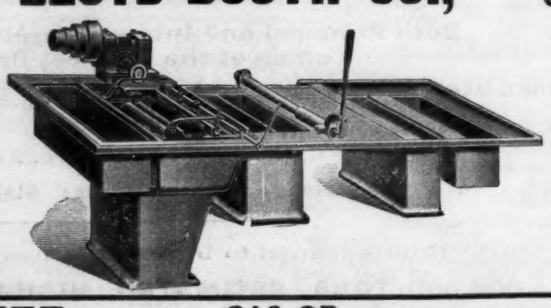

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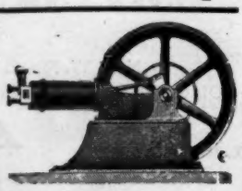

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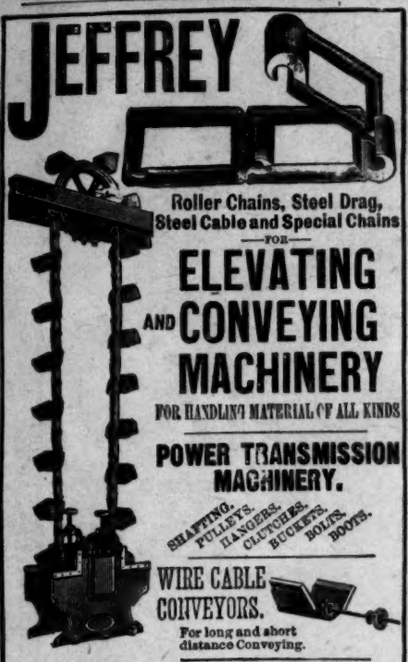

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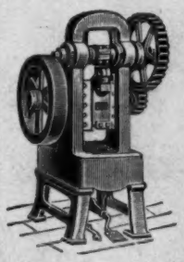

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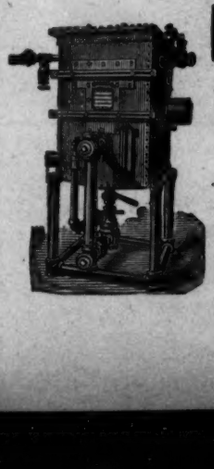

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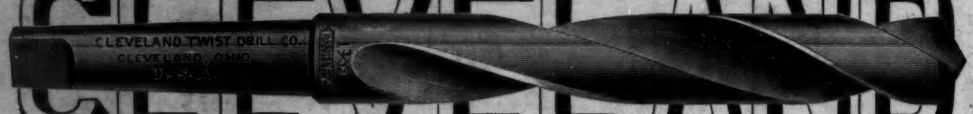

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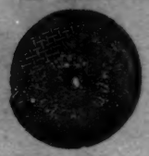

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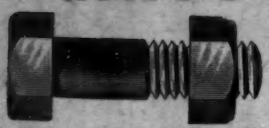

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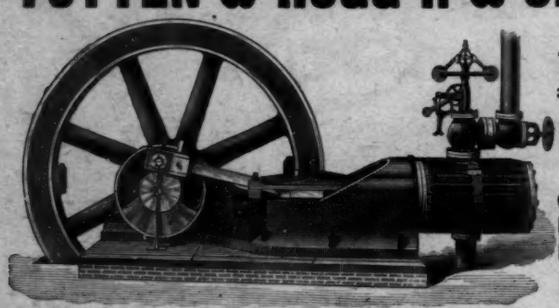

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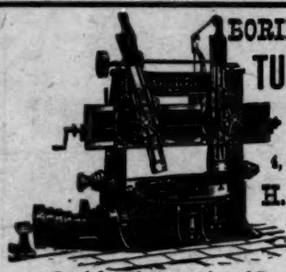

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